

FIG. 1C-1

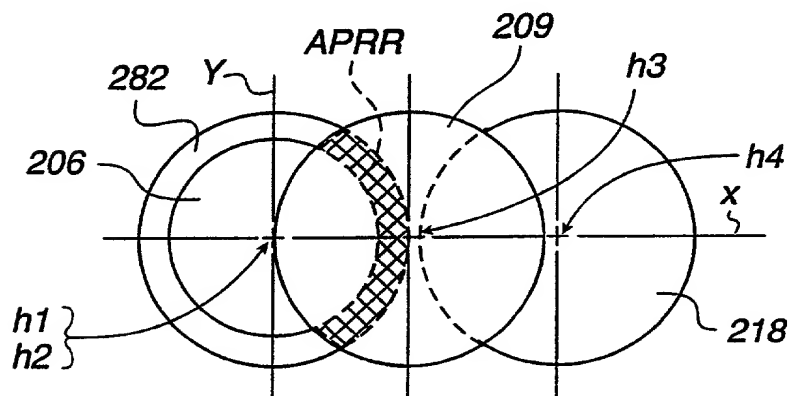


FIG. 1C-2

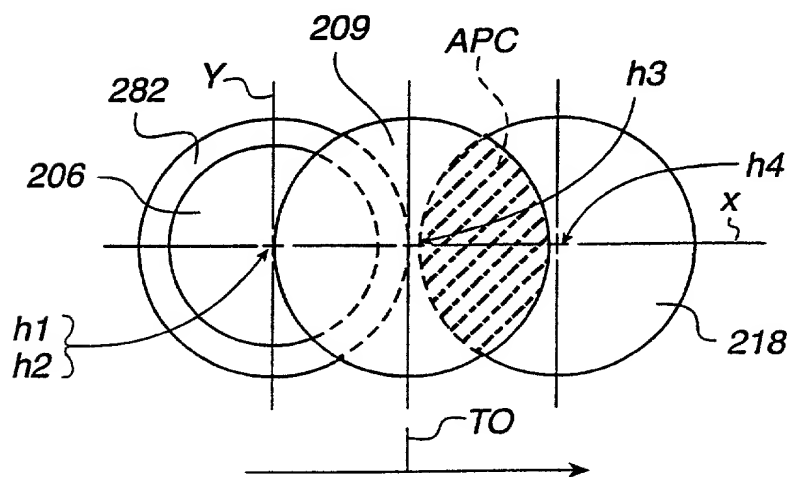


FIG. 1C-3

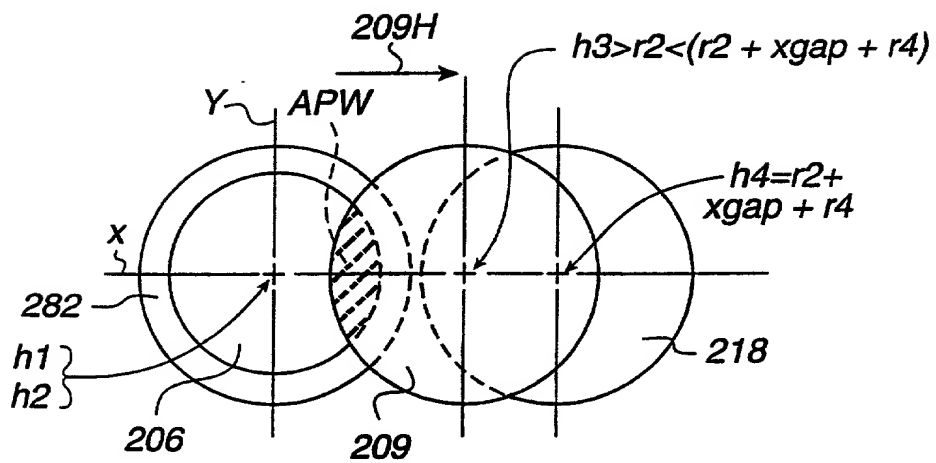


FIG. 1D-1

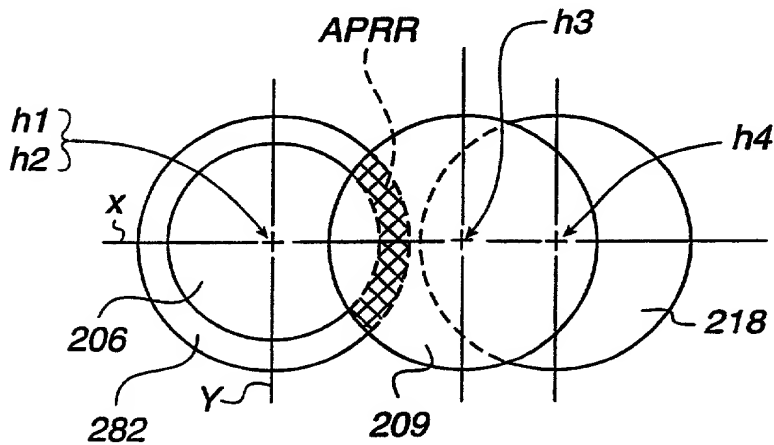


FIG. 1D-2

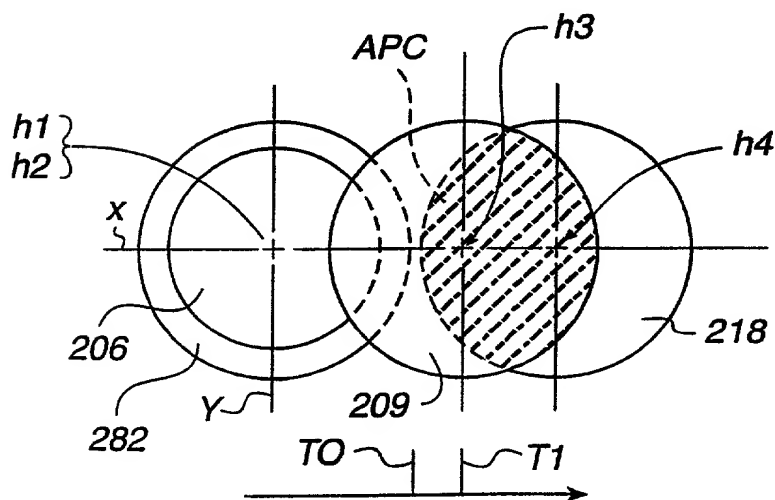


FIG. 1D-3

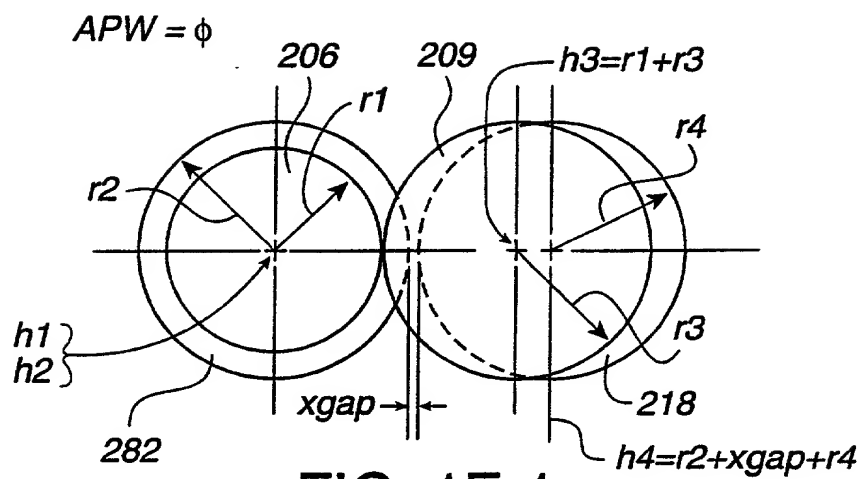


FIG. 1E-1

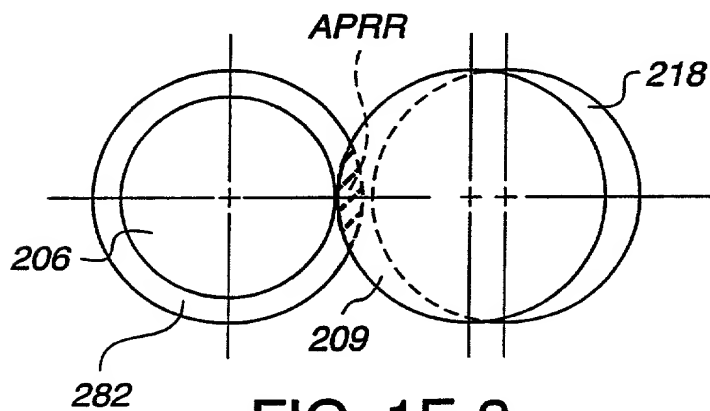


FIG. 1E-2

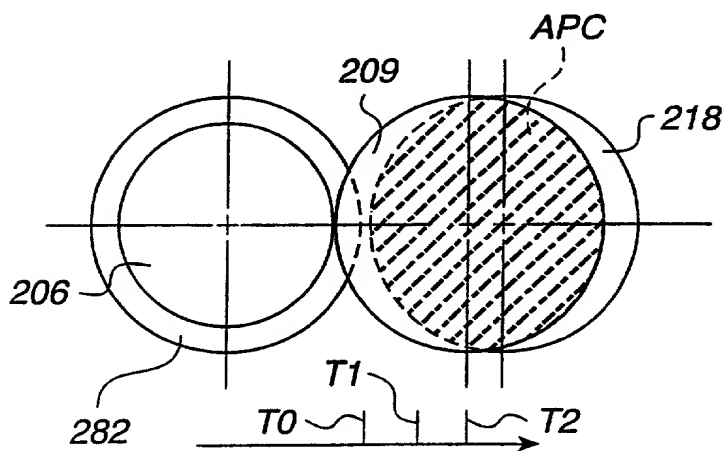
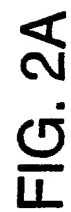
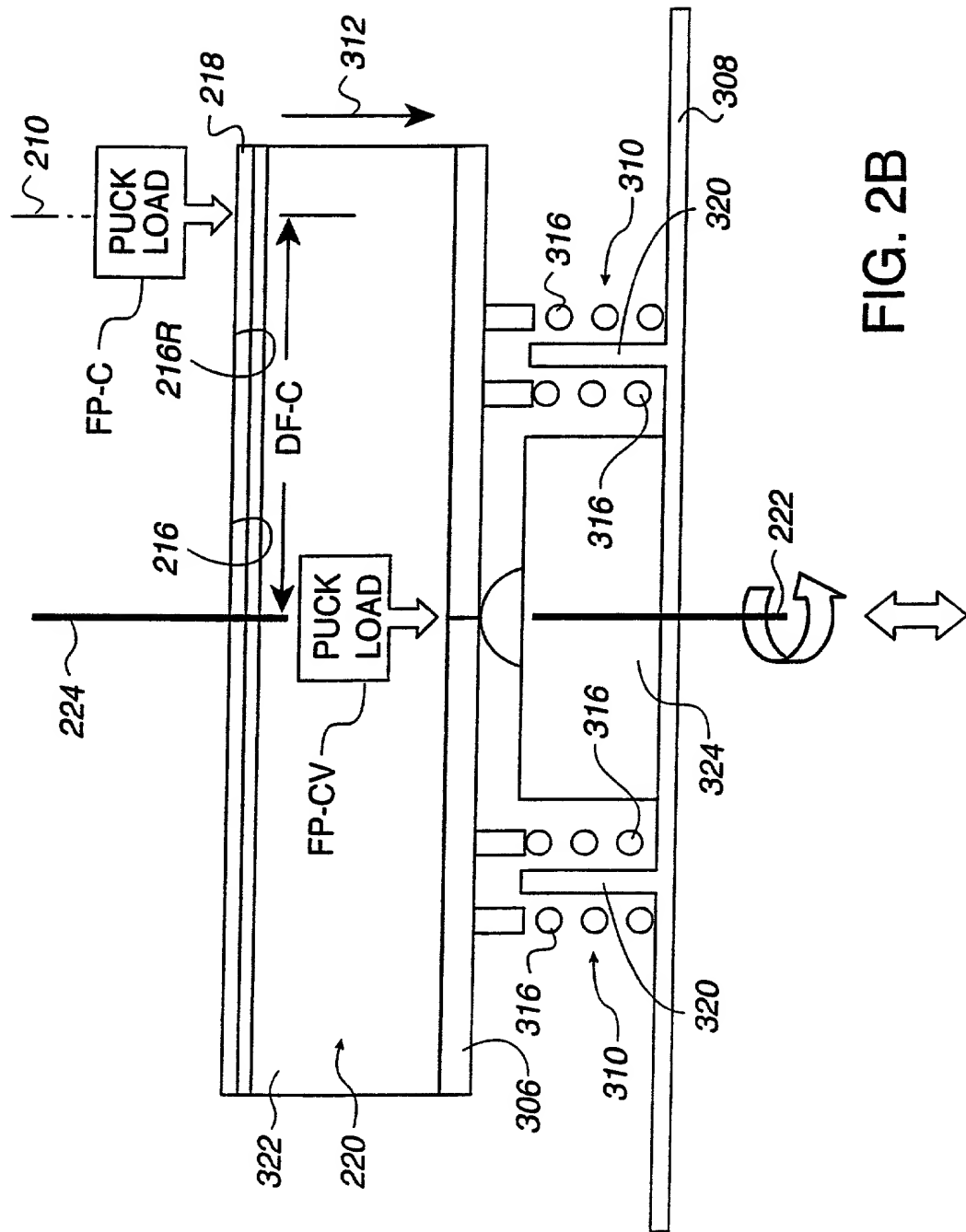


FIG. 1E-3





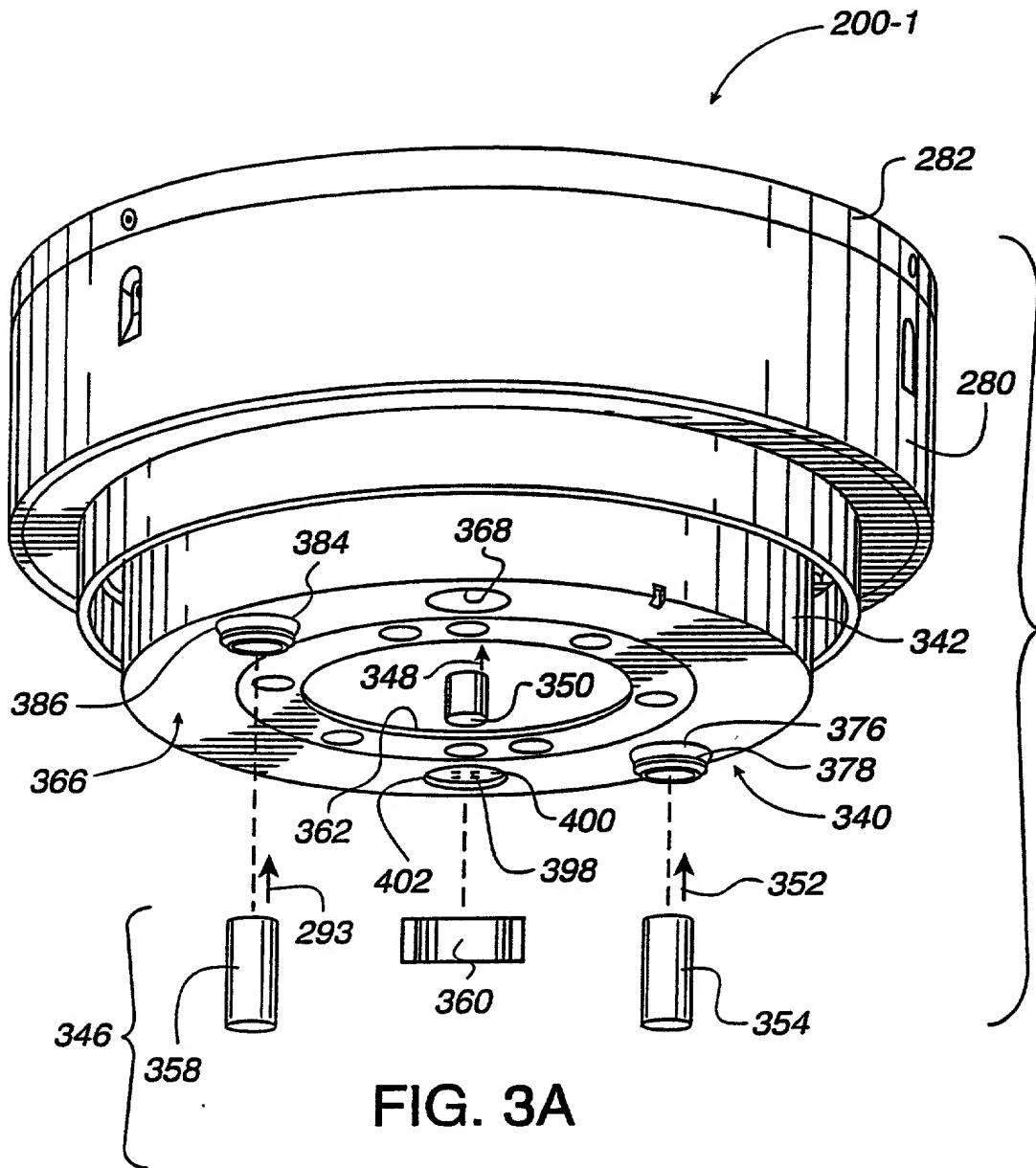


FIG. 3A

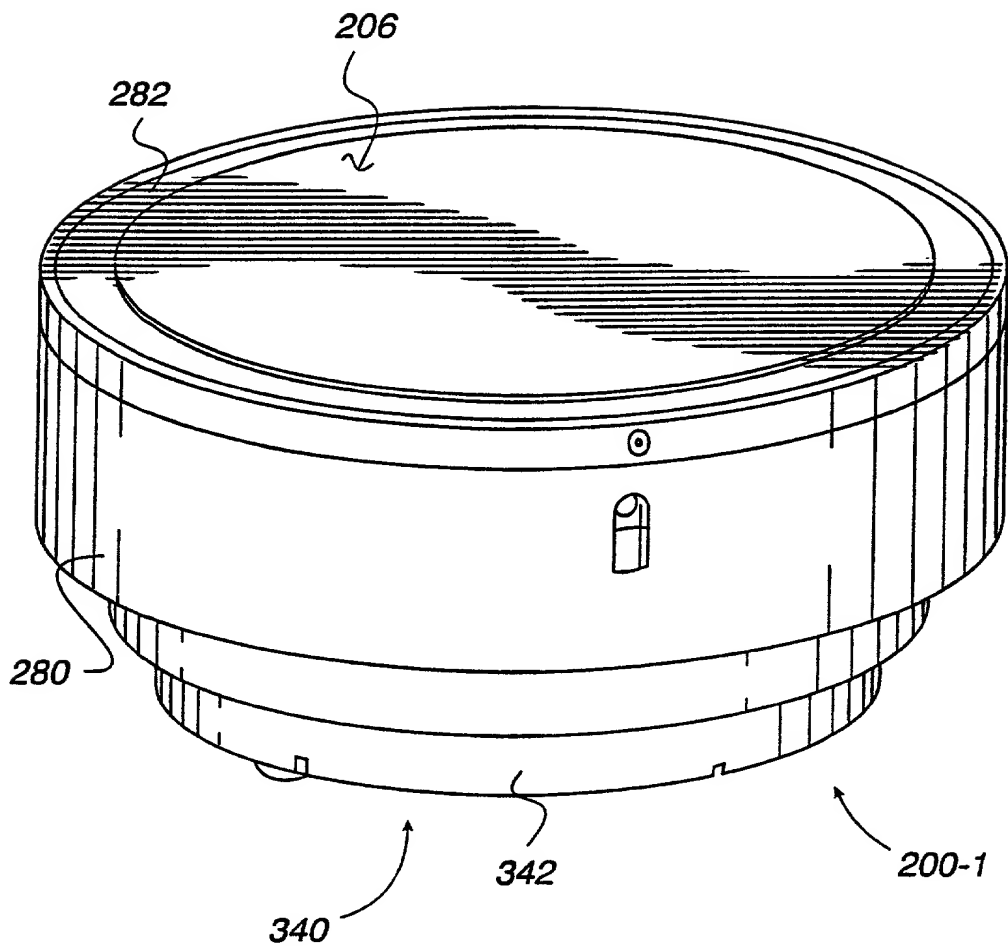


FIG. 3B

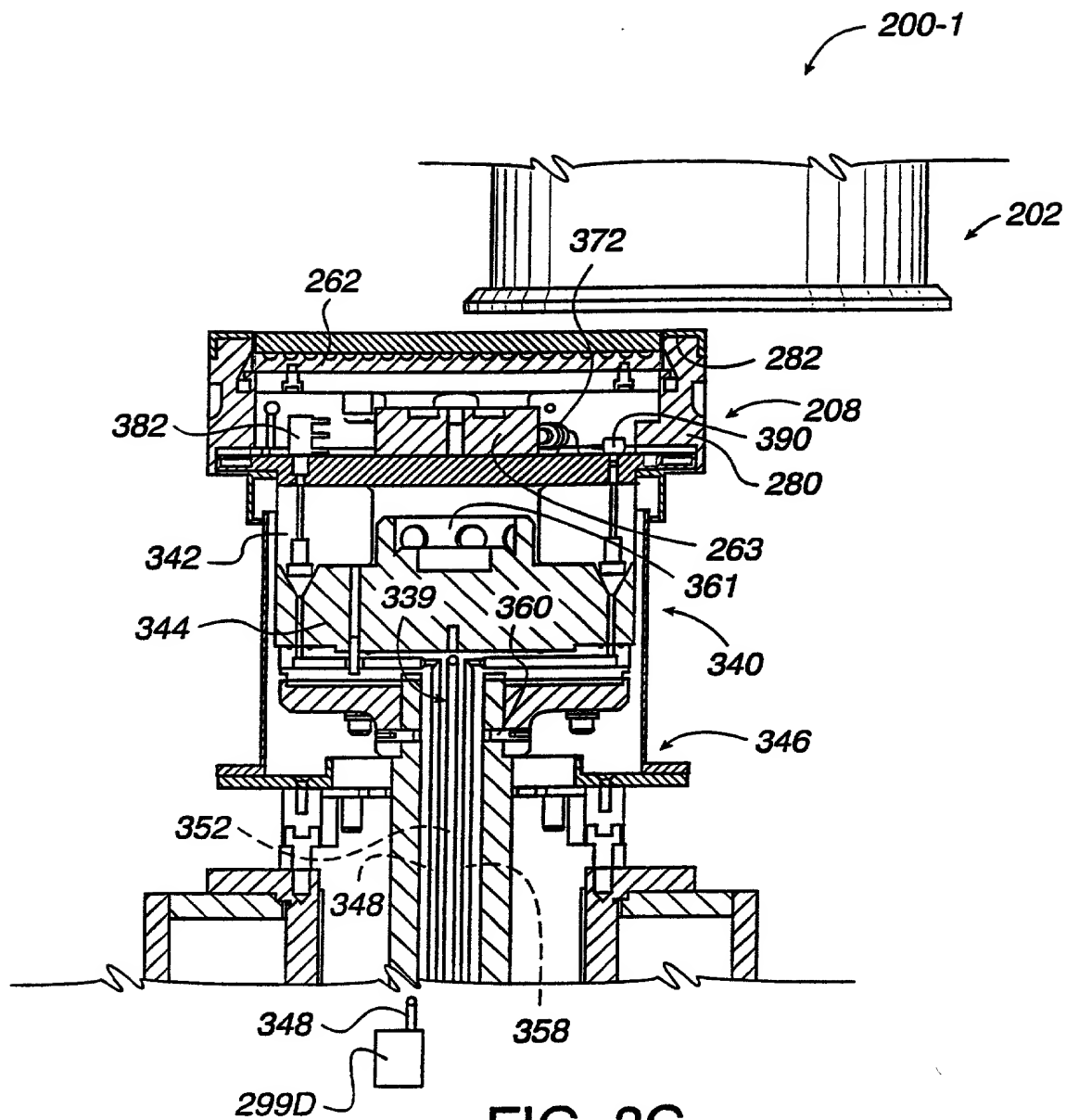
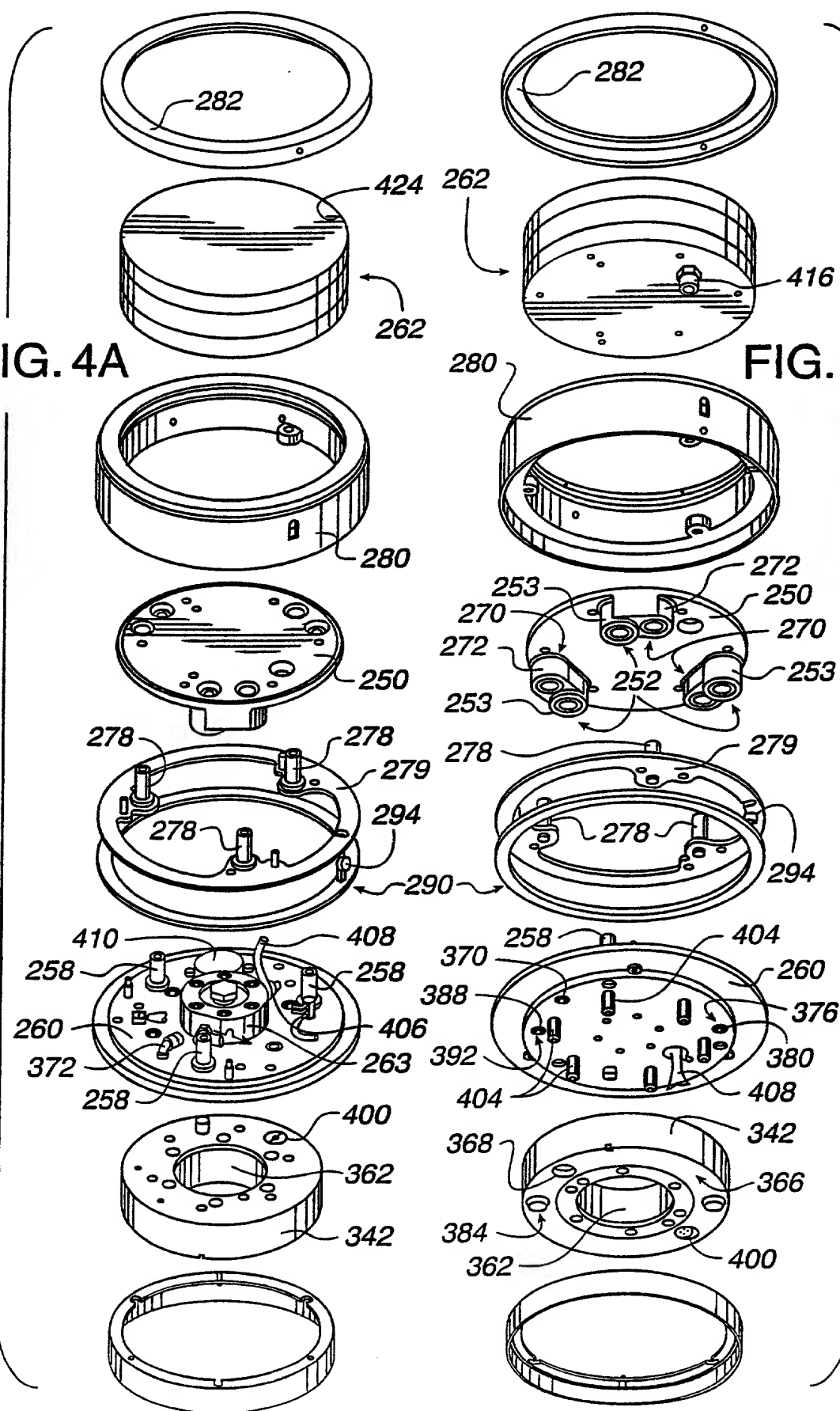


FIG. 3C

FIG. 4A

FIG. 4B



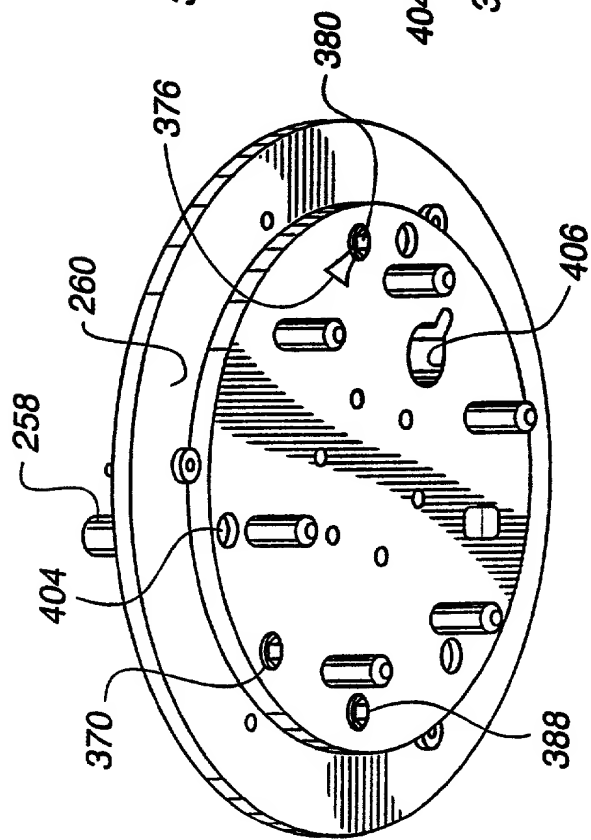


FIG. 5A-1

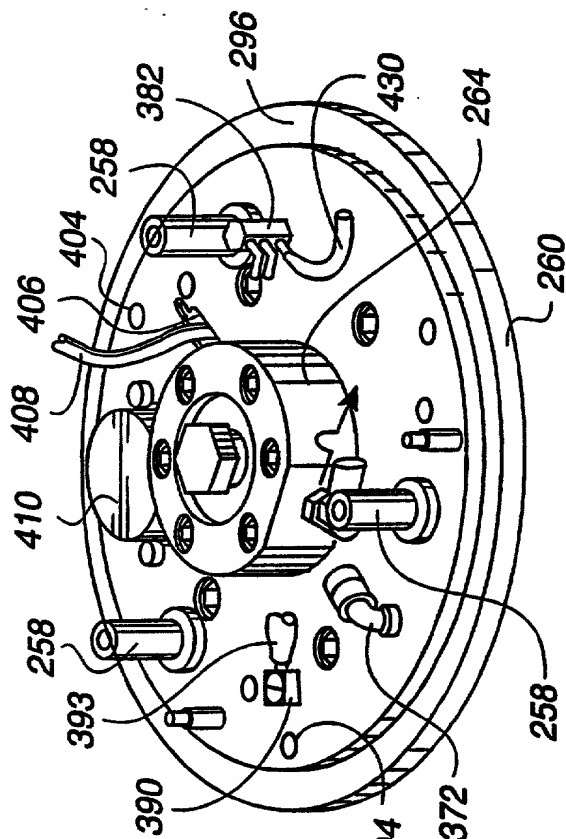


FIG. 5B-1

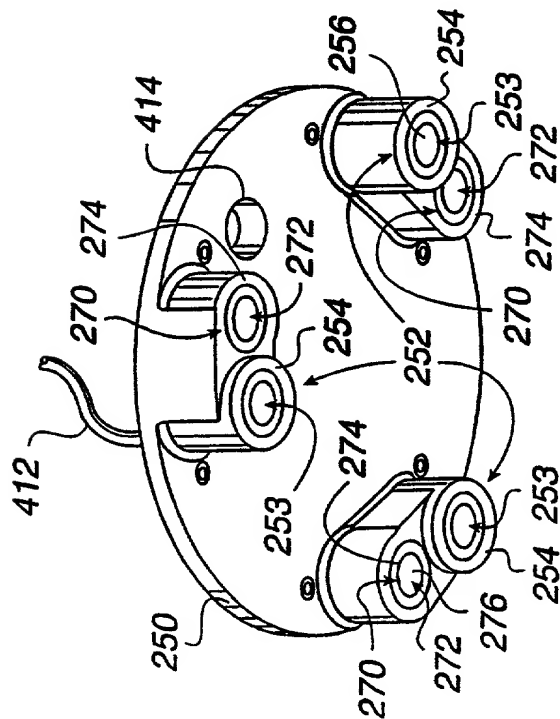


FIG. 5A-2

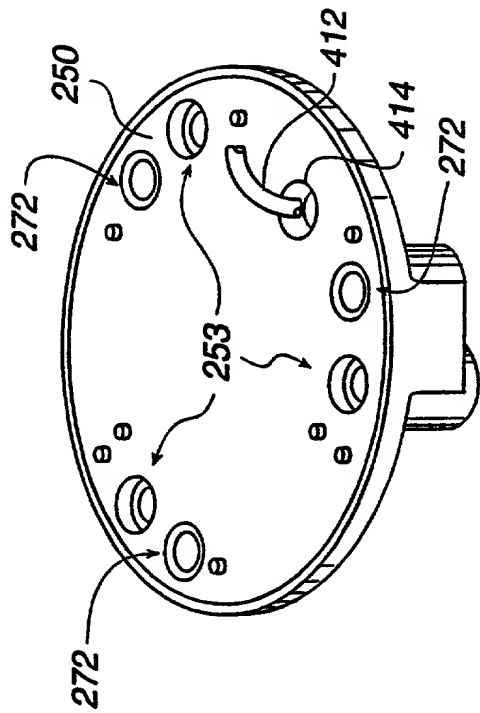


FIG. 5B-2

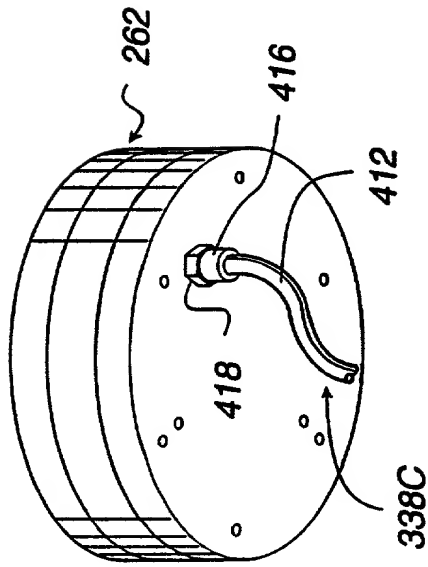


FIG. 5A-3

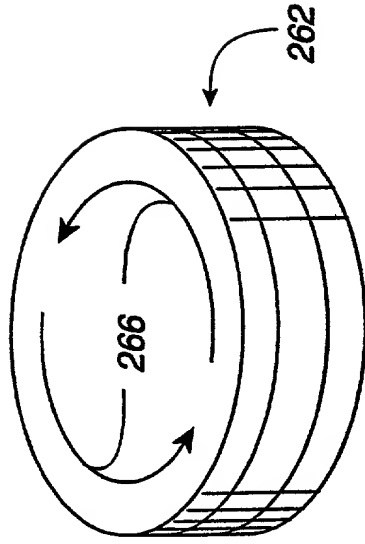


FIG. 5B-3

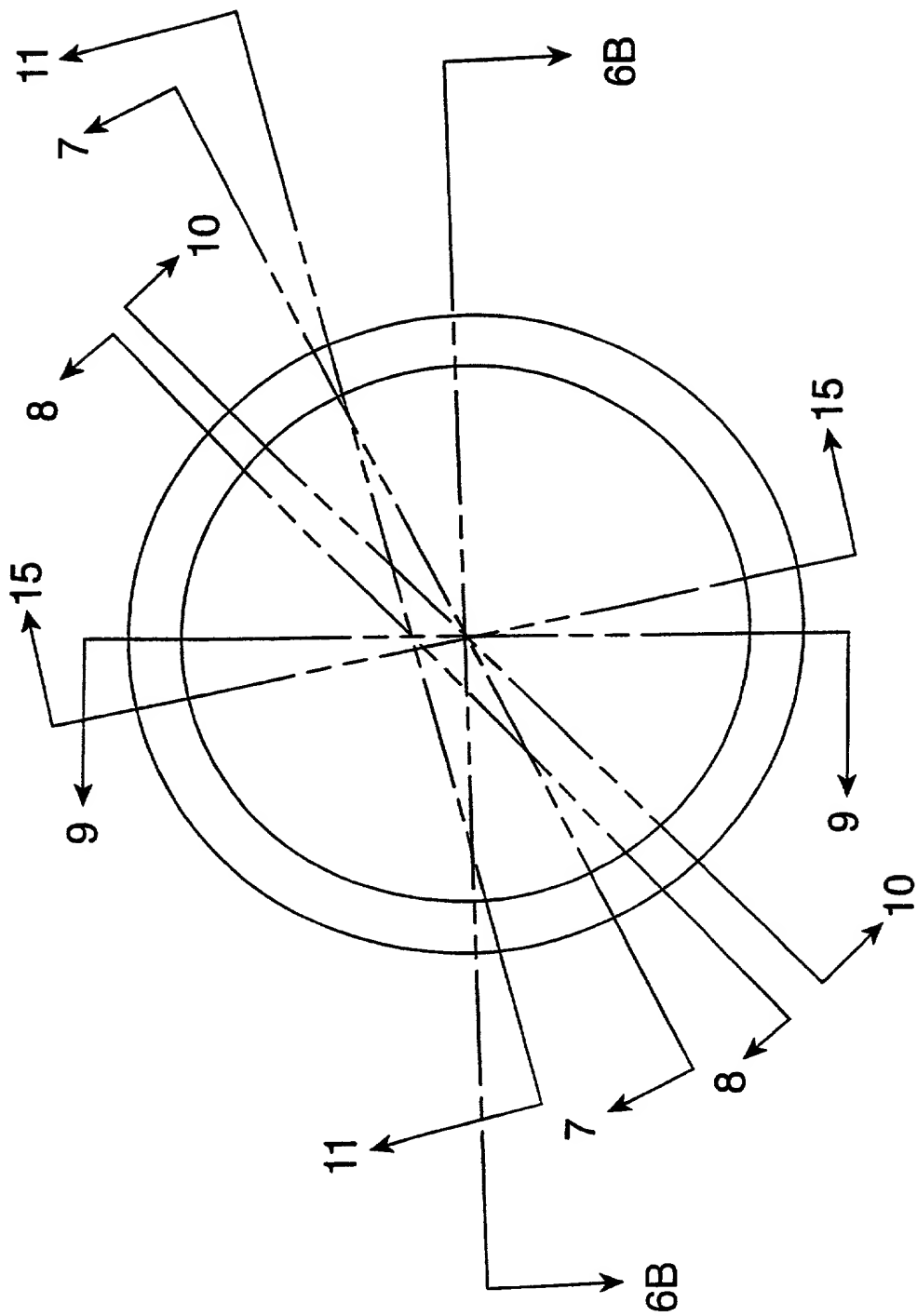


FIG. 6A

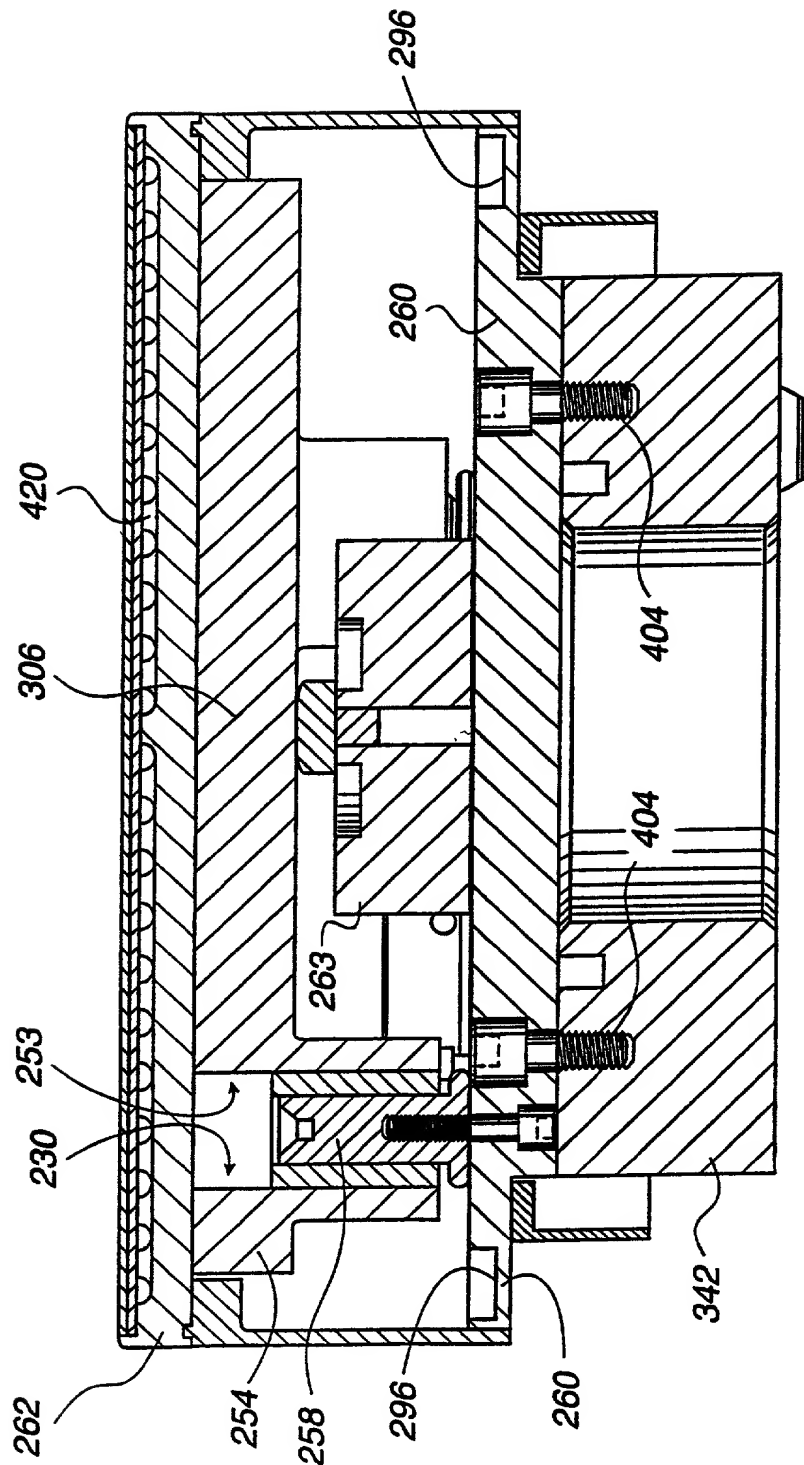


FIG. 6B

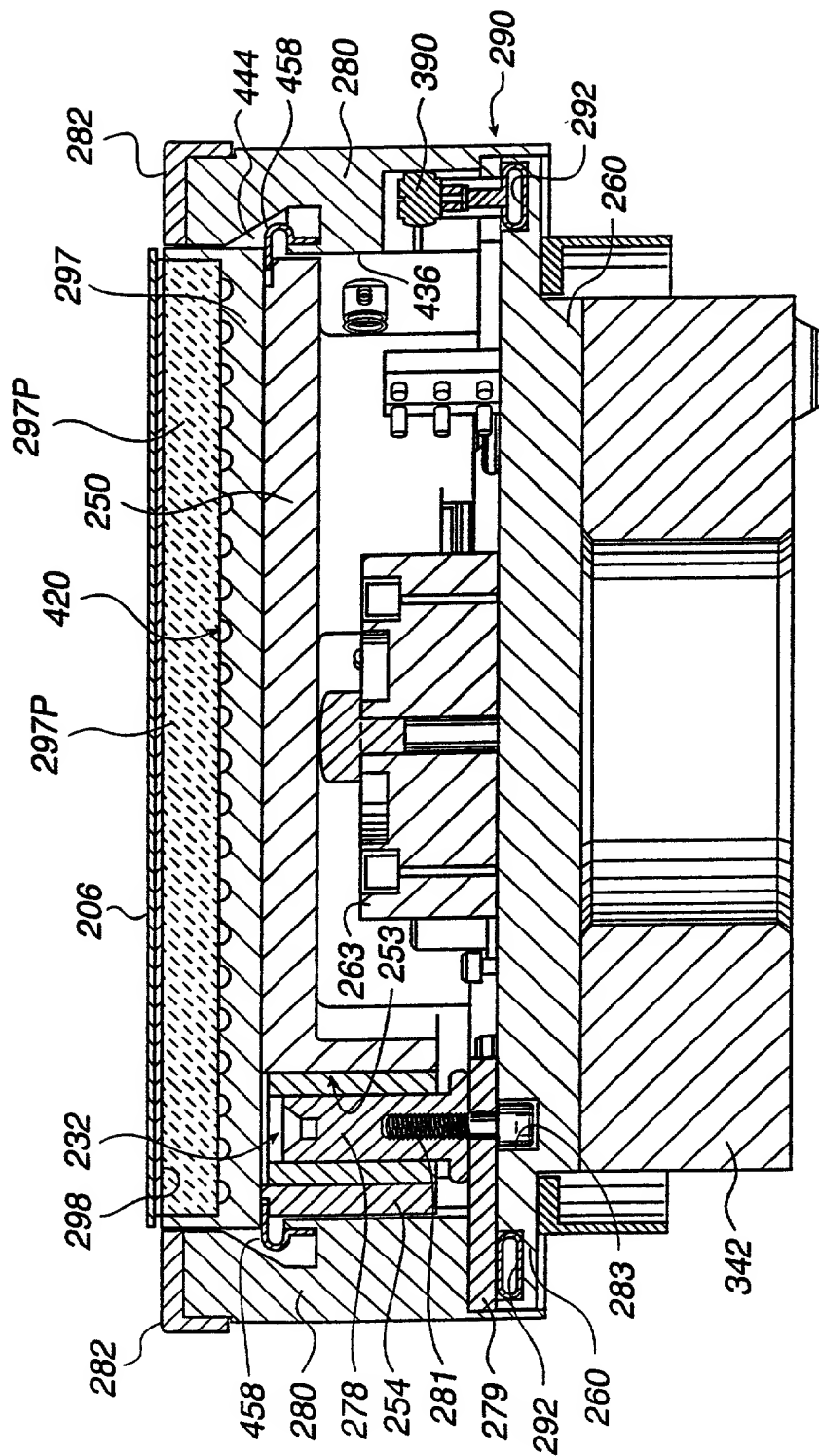


FIG. 7

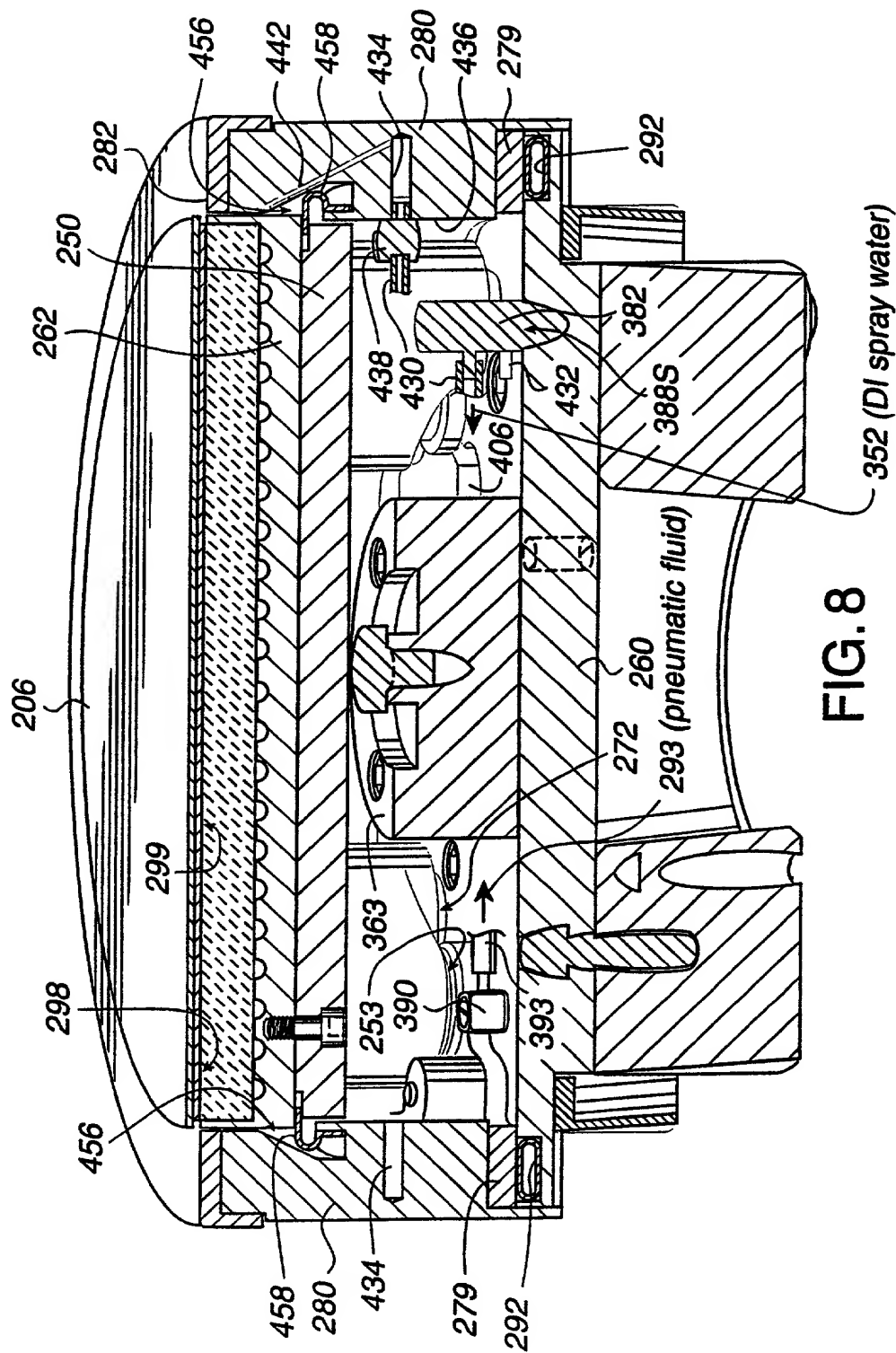


FIG. 8

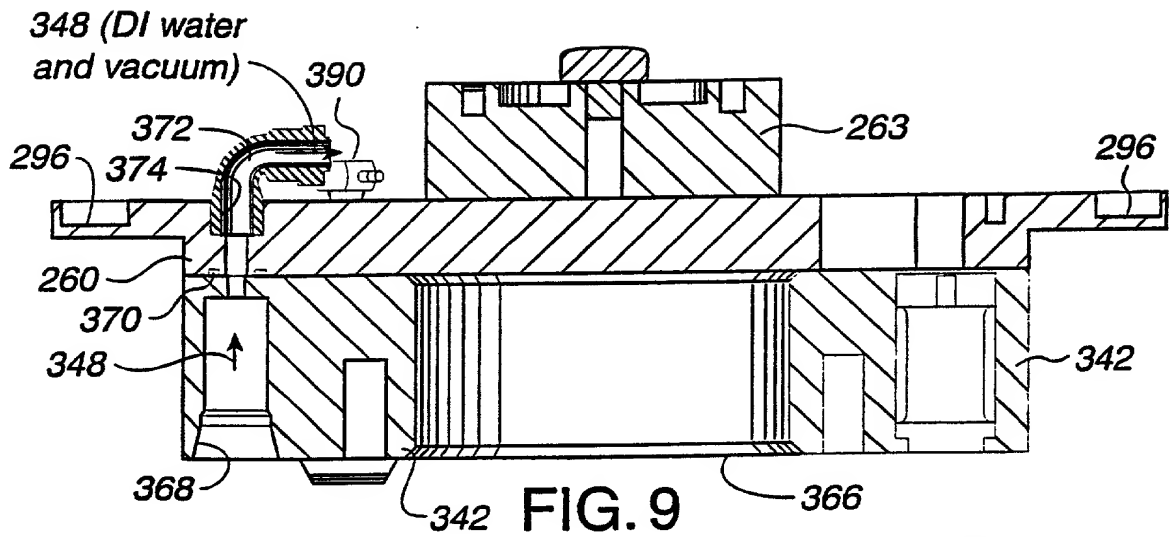


FIG. 9

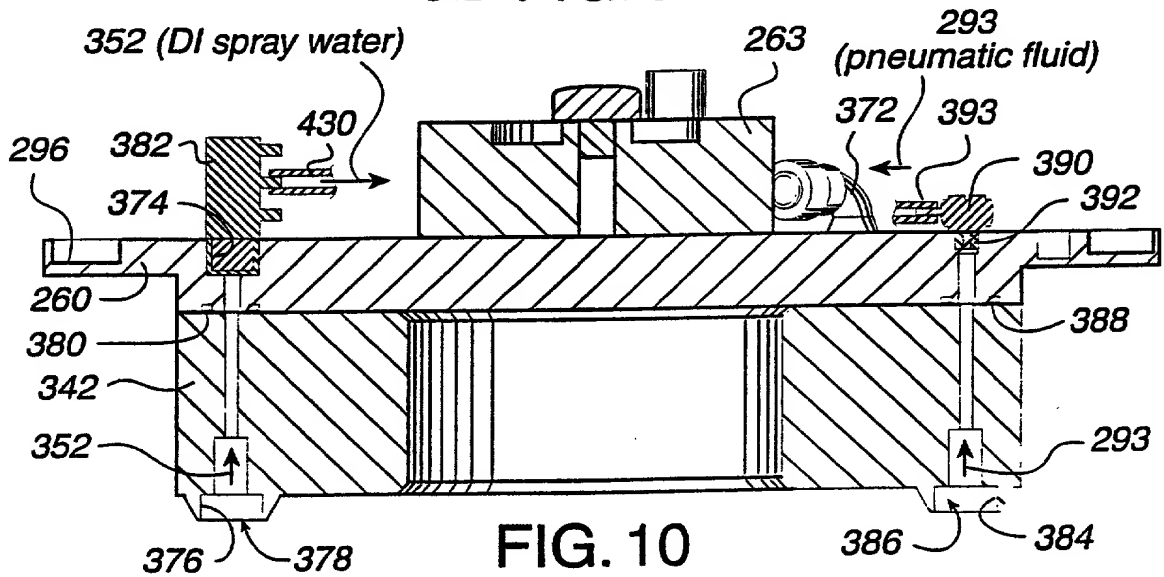


FIG. 10

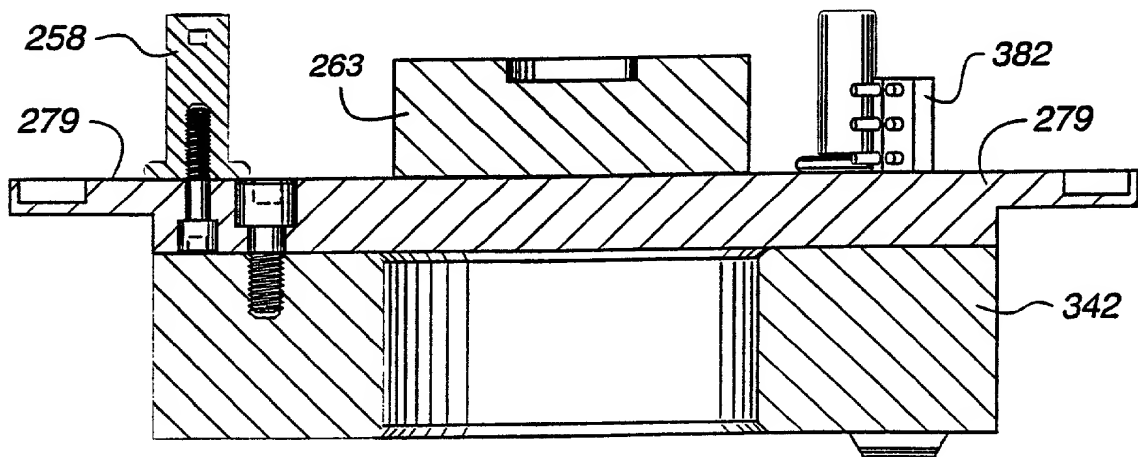
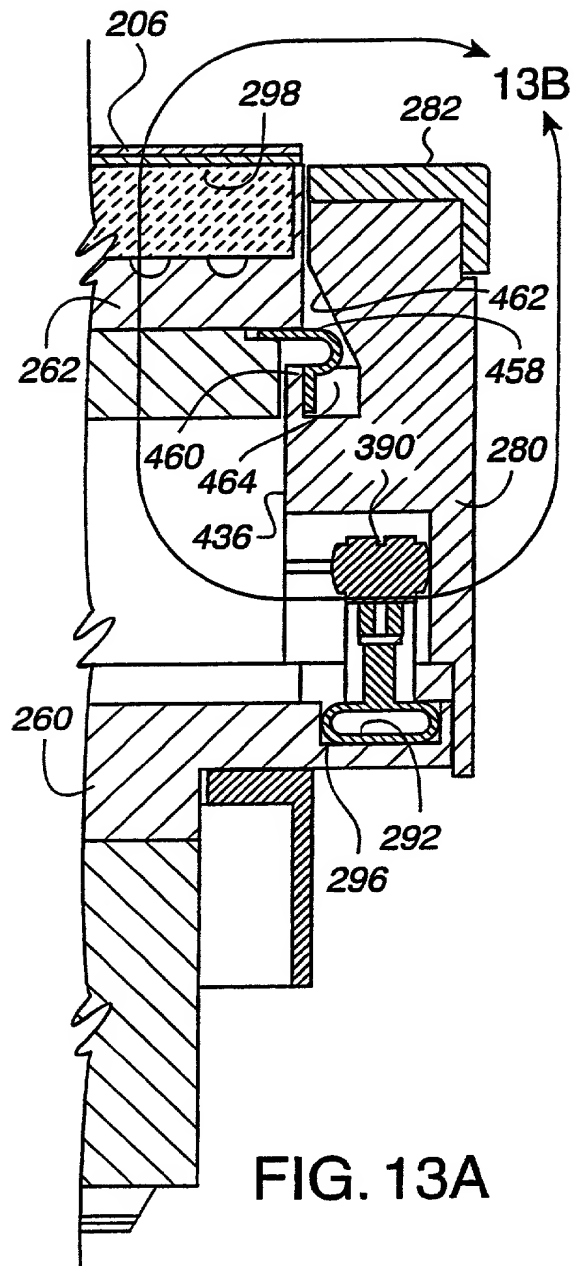
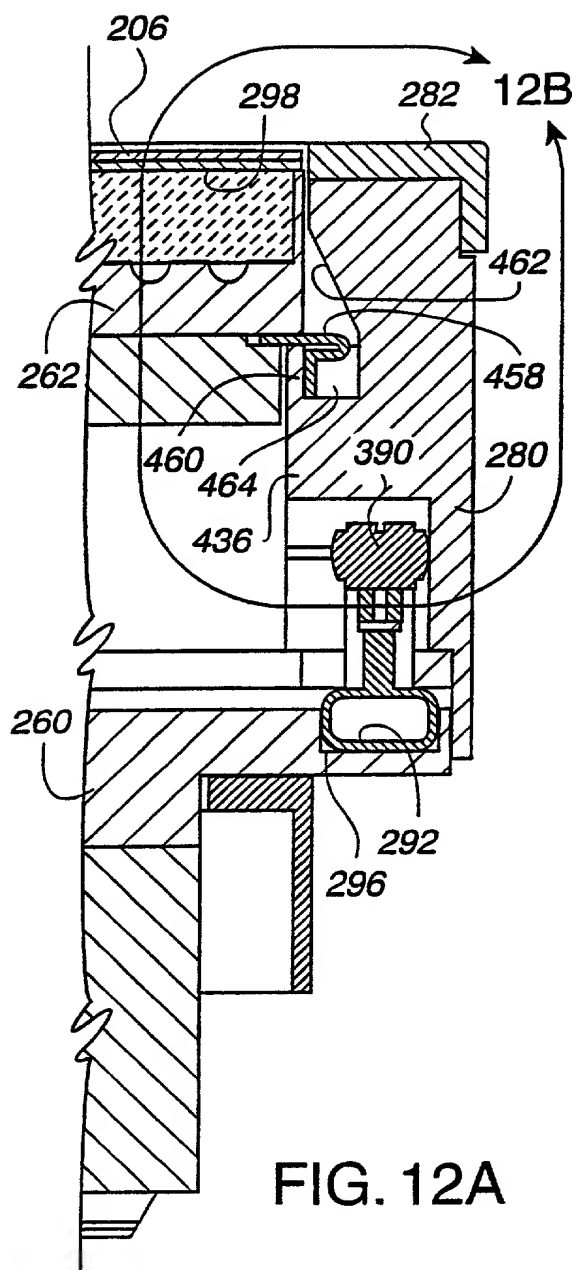


FIG. 11



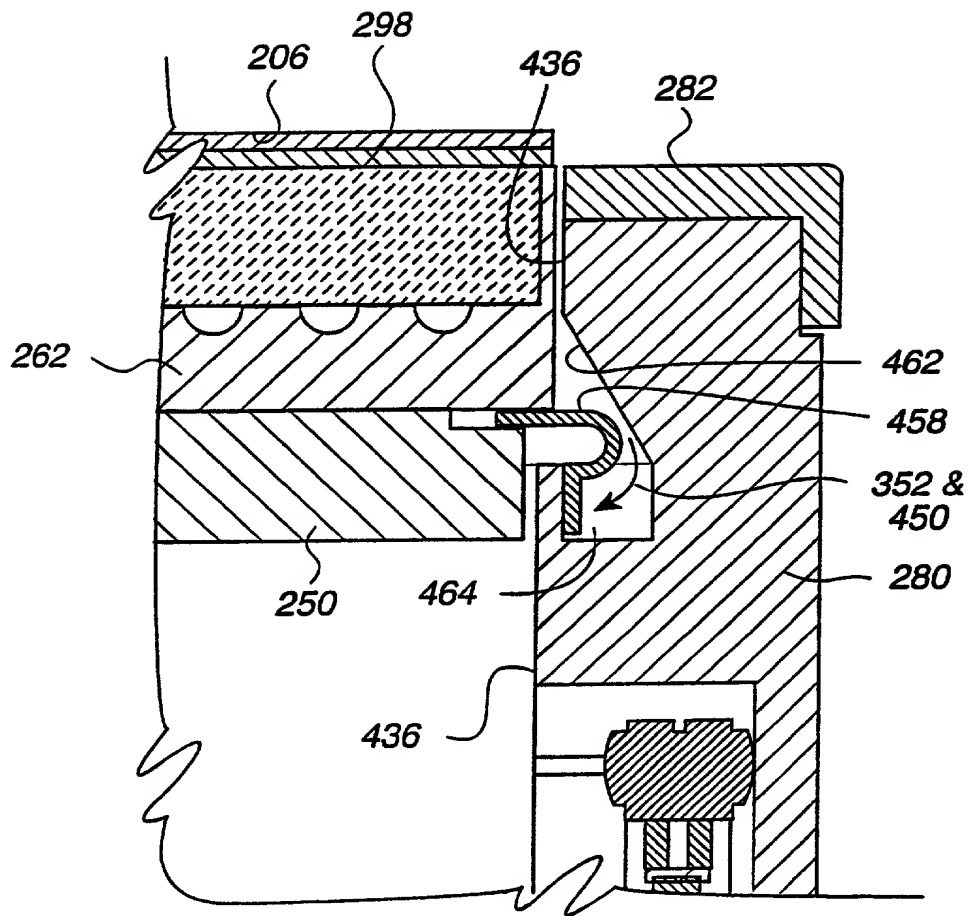
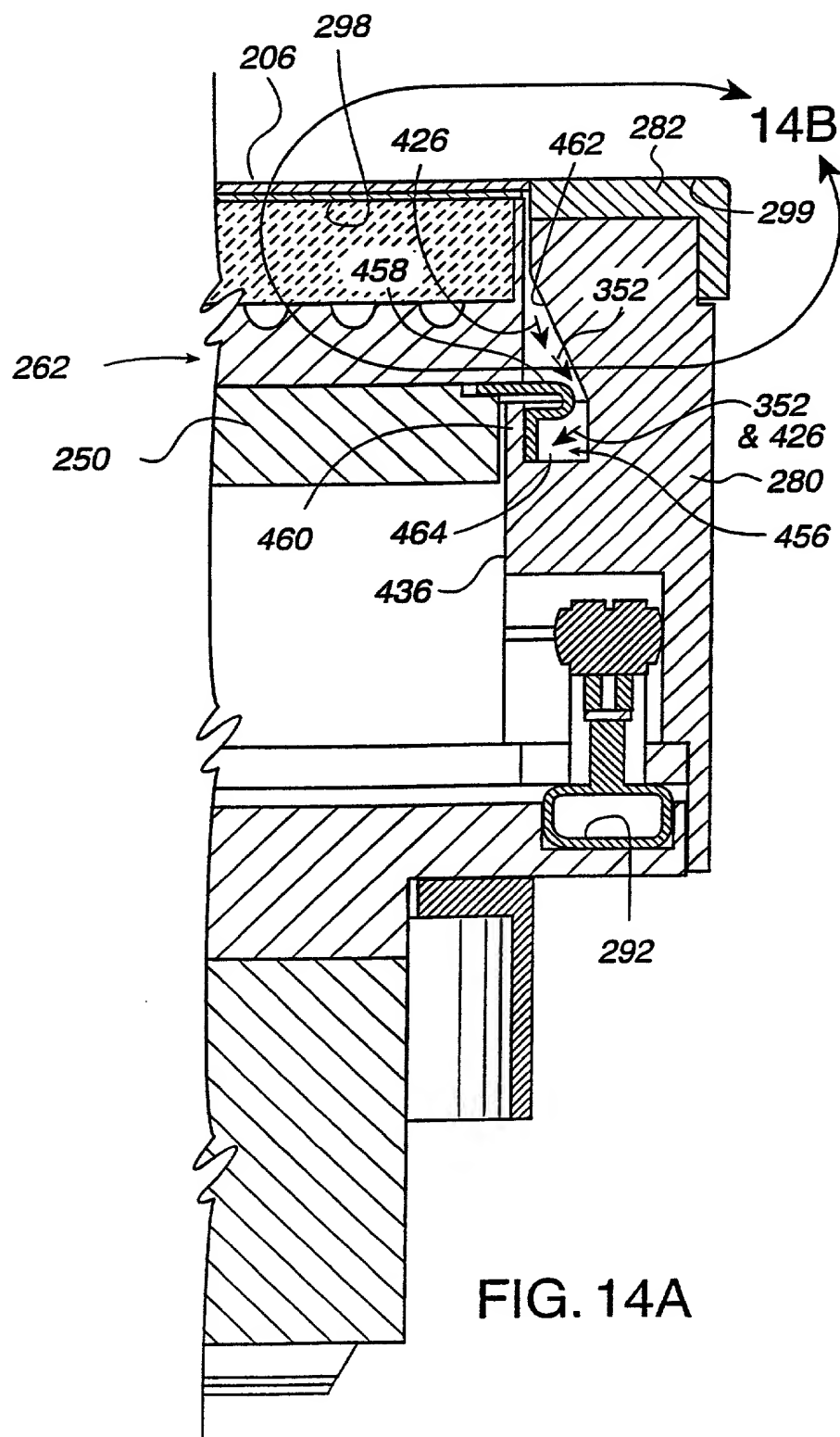


FIG. 13B



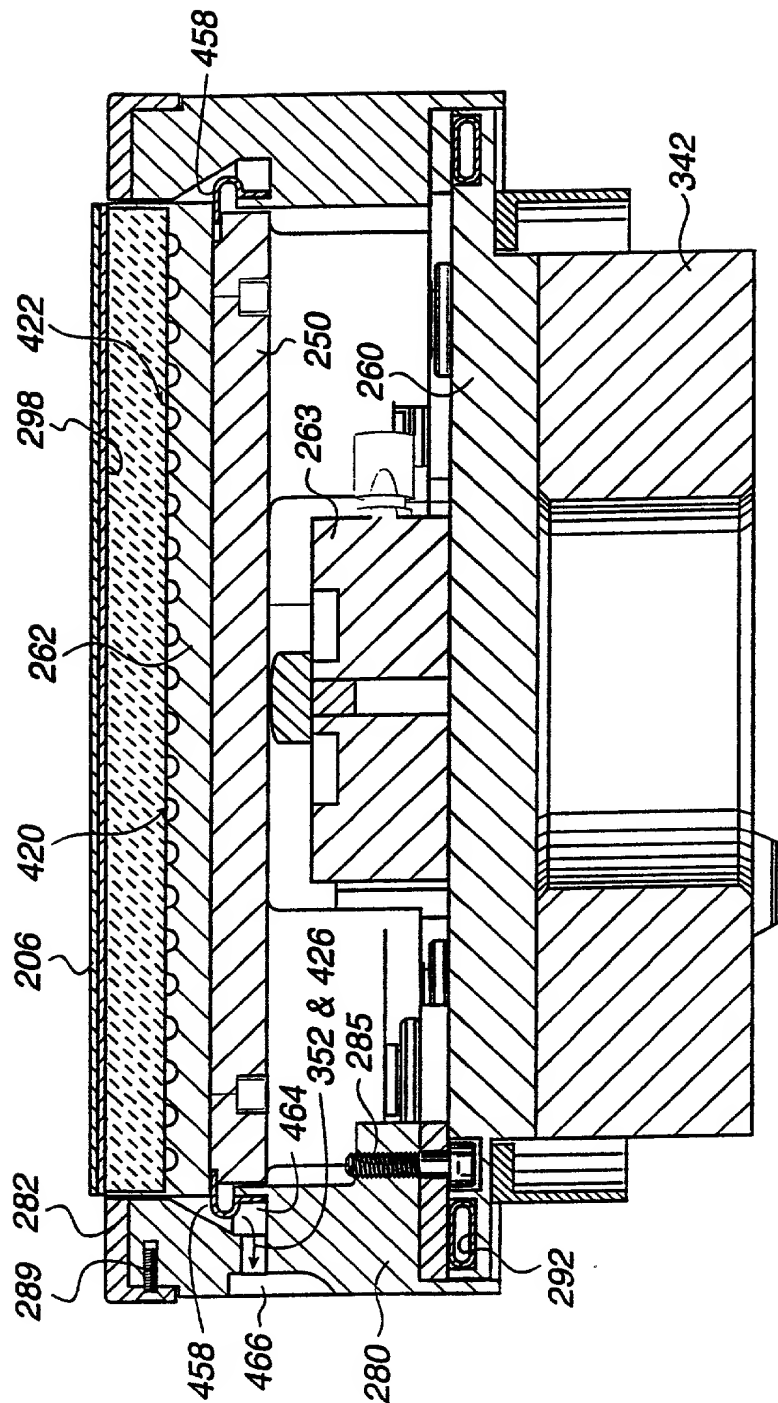
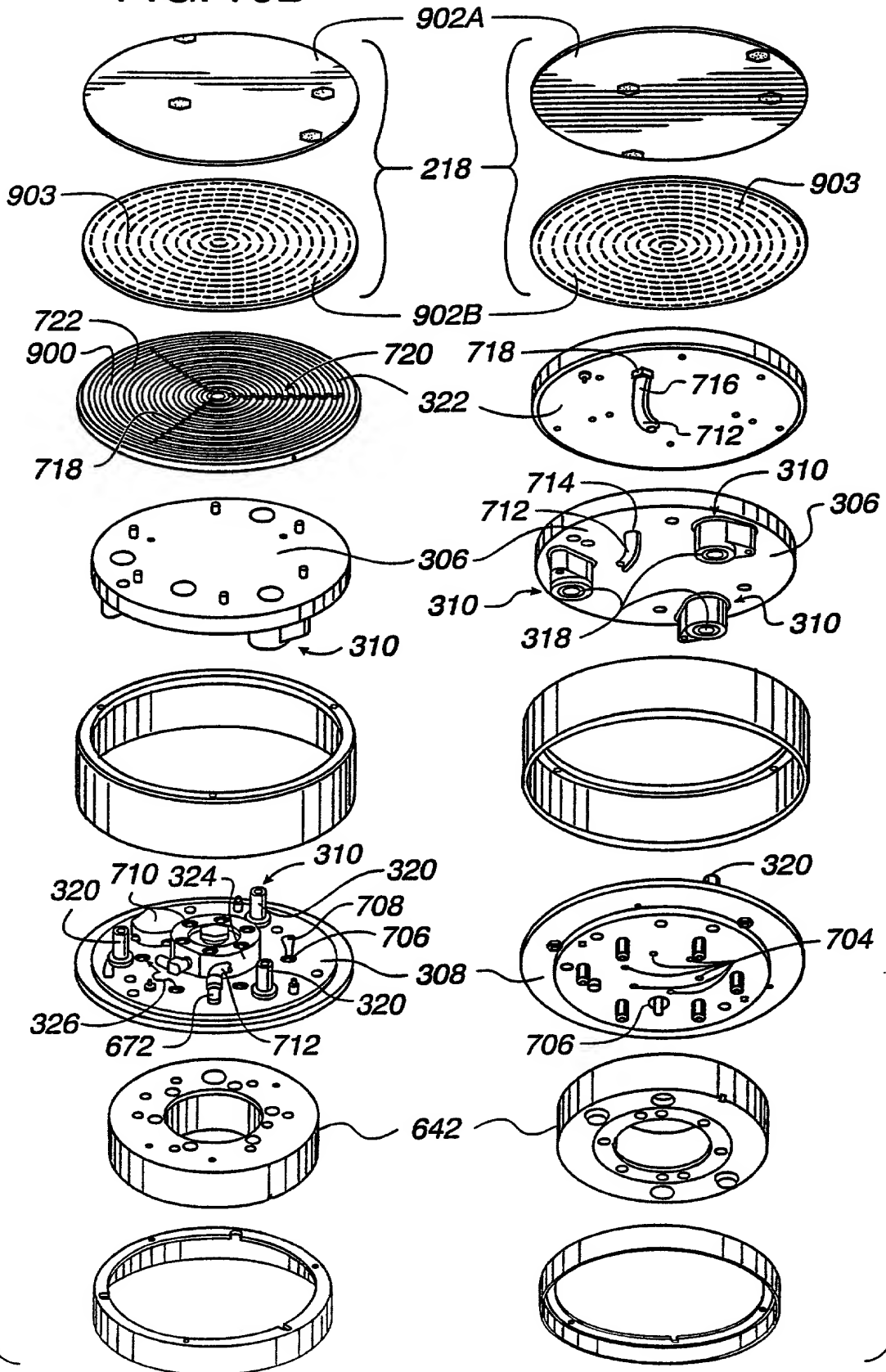


FIG. 15

FIG. 16B is a perspective view of the upper portion of the device 100, showing the top surface of the housing 300 and the top surface of the base 700. The housing 300 includes a top surface 306 and a bottom surface 310. The base 700 includes a top surface 706 and a bottom surface 704. The housing 300 is shown in a partially exploded view, with the top surface 306 and the bottom surface 310 separated from the base 700. The base 700 is shown in a partially exploded view, with the top surface 706 and the bottom surface 704 separated from the housing 300. The housing 300 and the base 700 are shown in a perspective view, with the top surface 306 and the top surface 706 facing each other. The housing 300 and the base 700 are shown in a perspective view, with the top surface 306 and the top surface 706 facing each other.

FIG. 16B

FIG. 16A



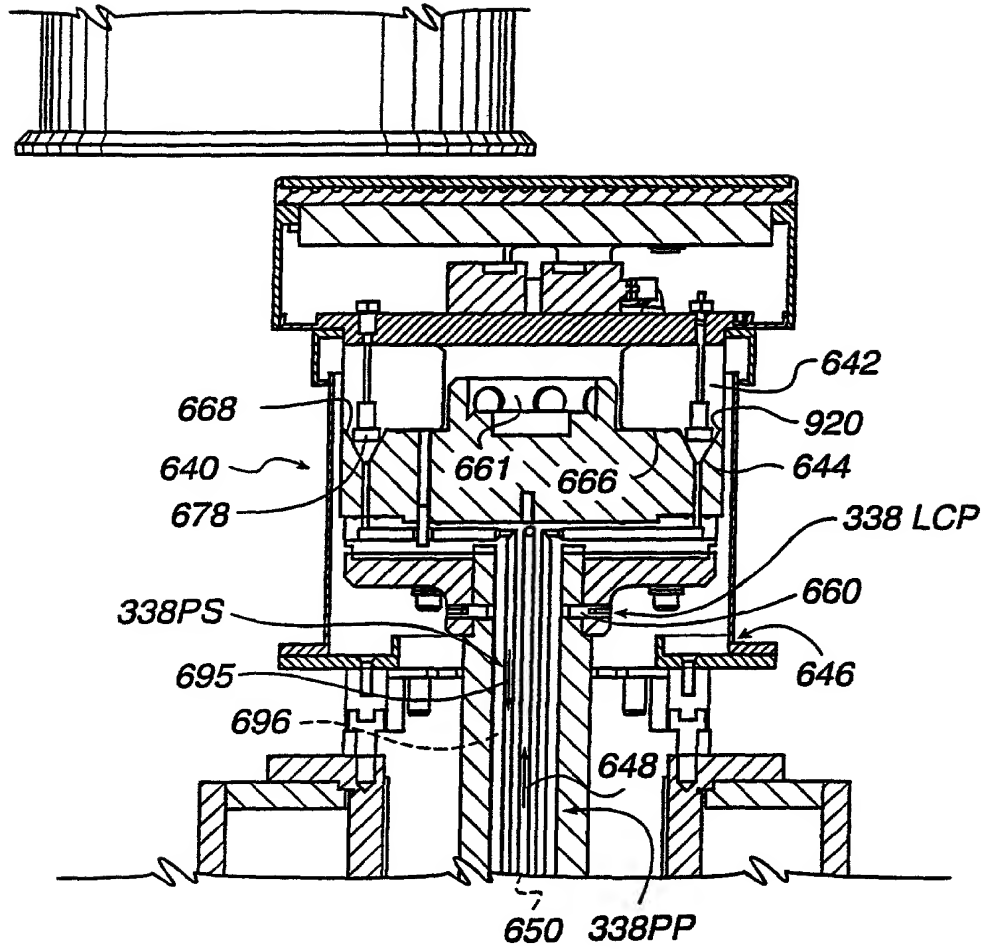


FIG. 17C

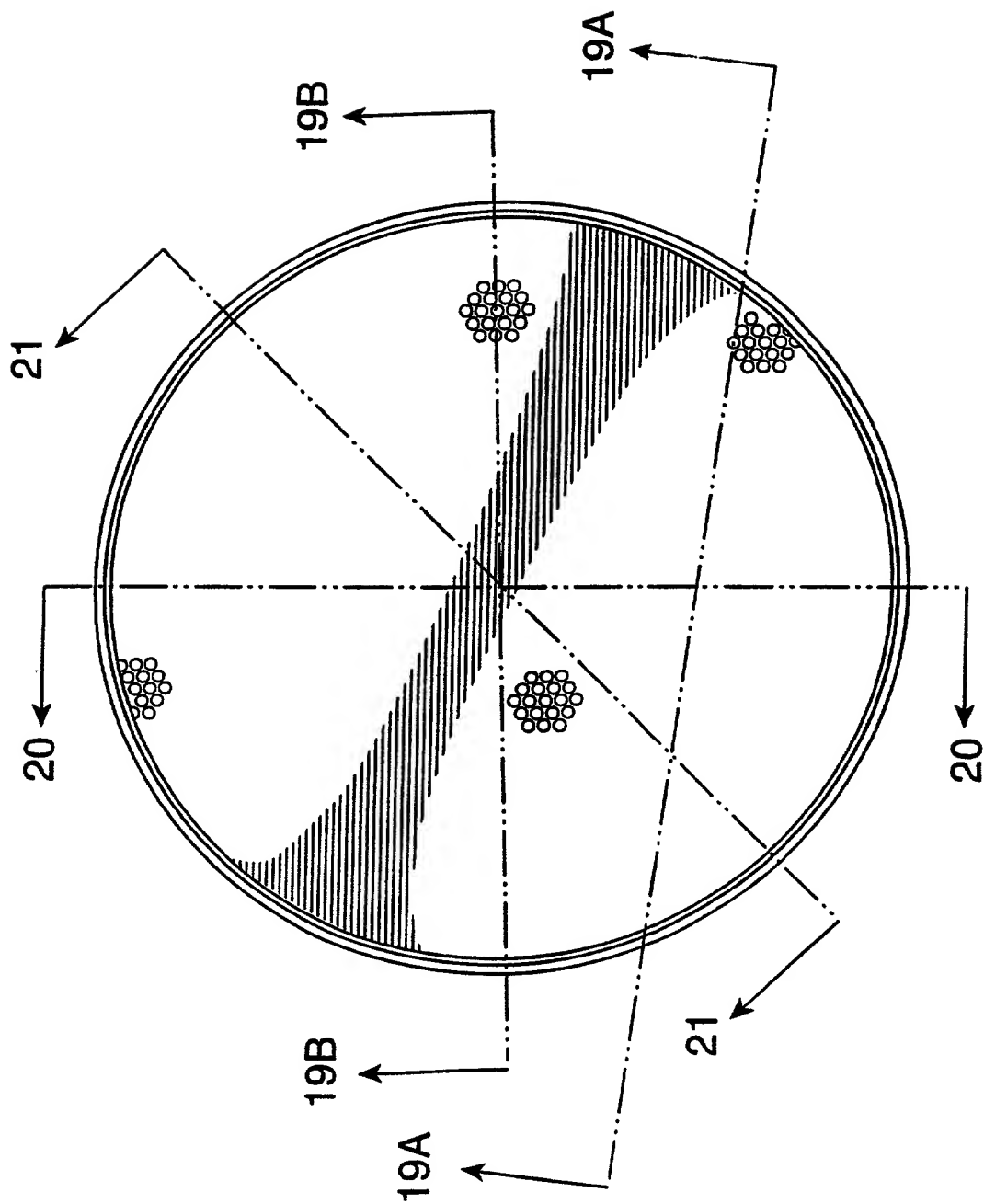


FIG. 18

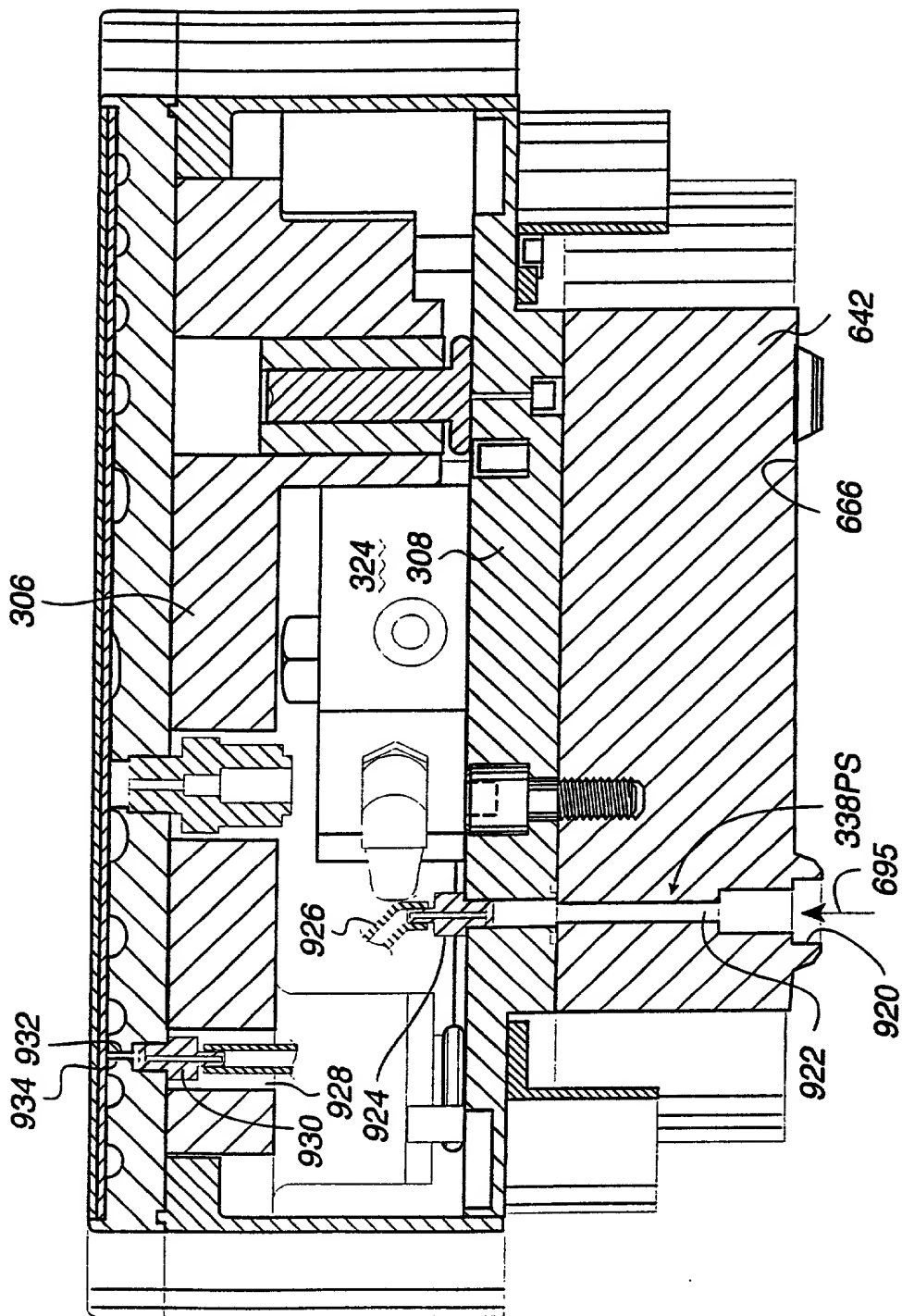


FIG. 19A

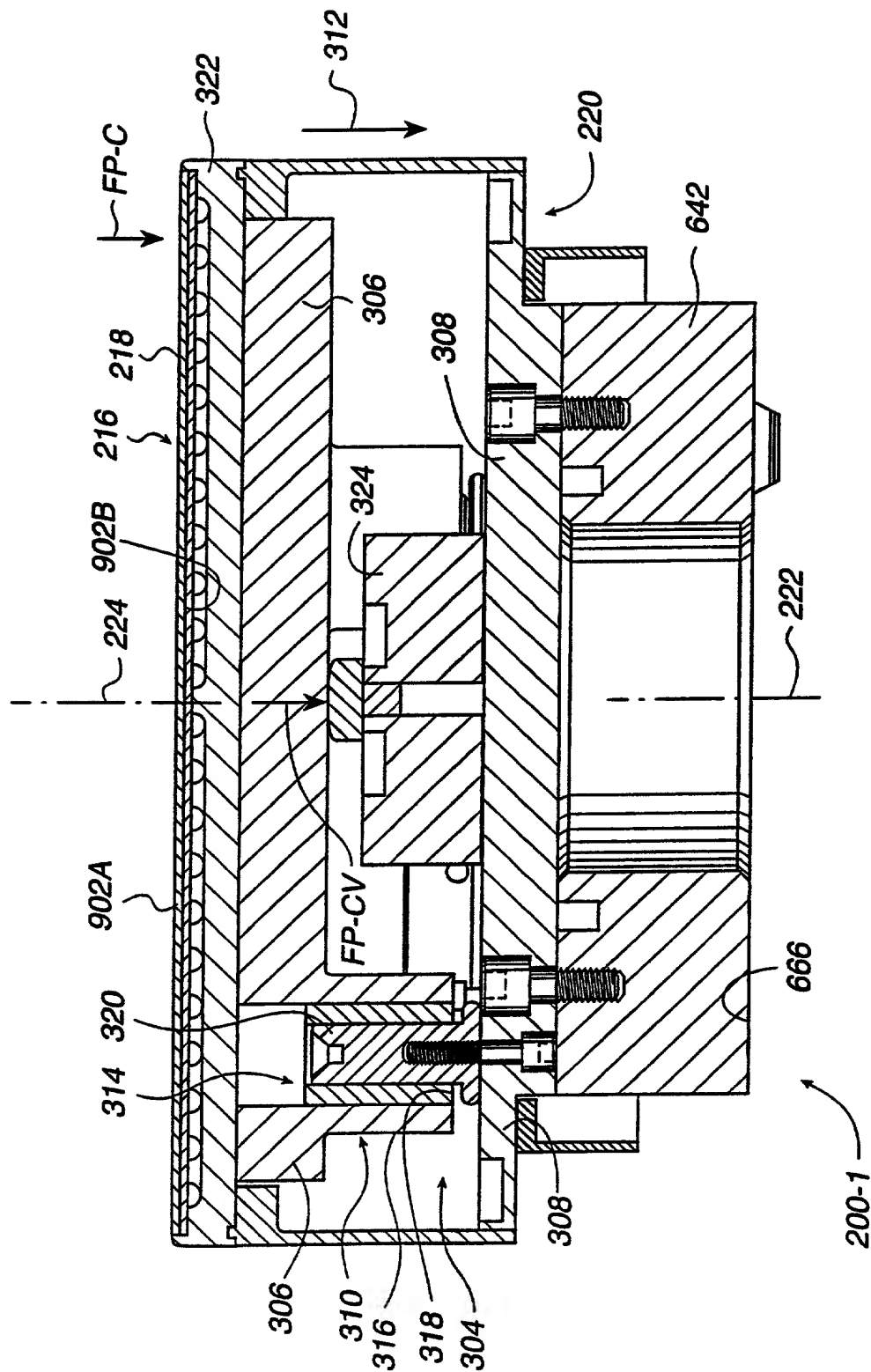


FIG. 19B

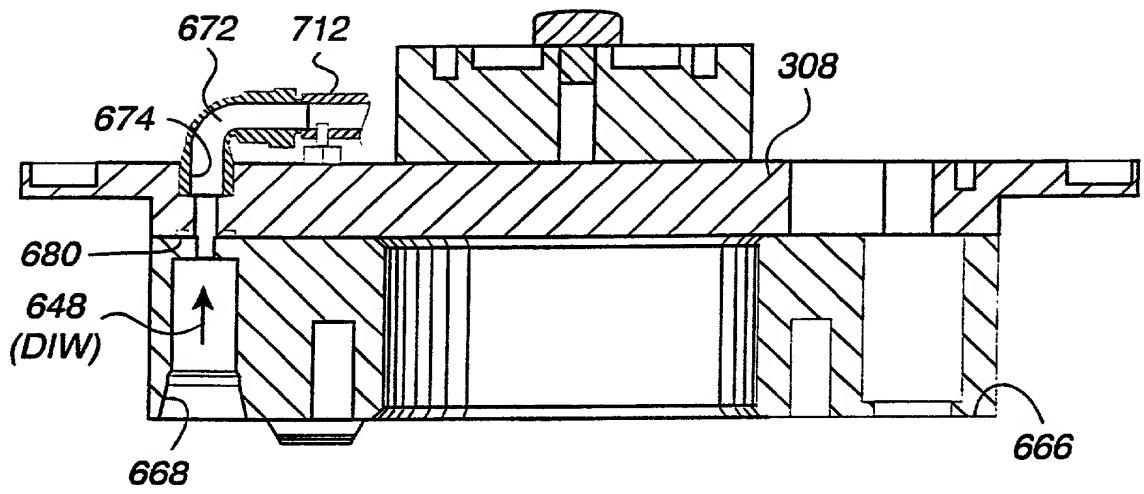


FIG. 20

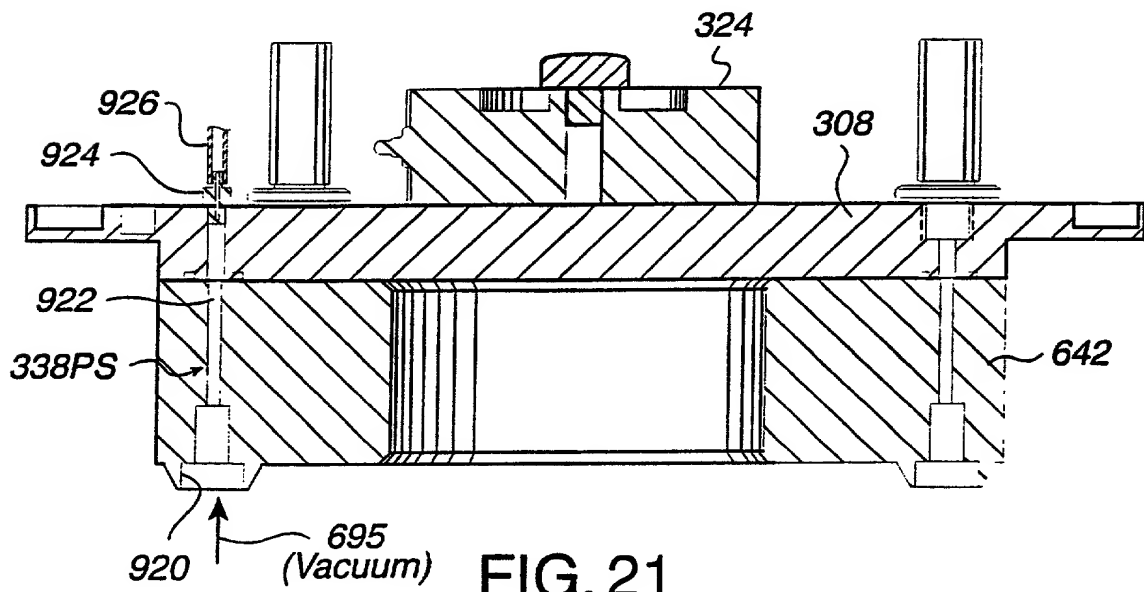


FIG. 21

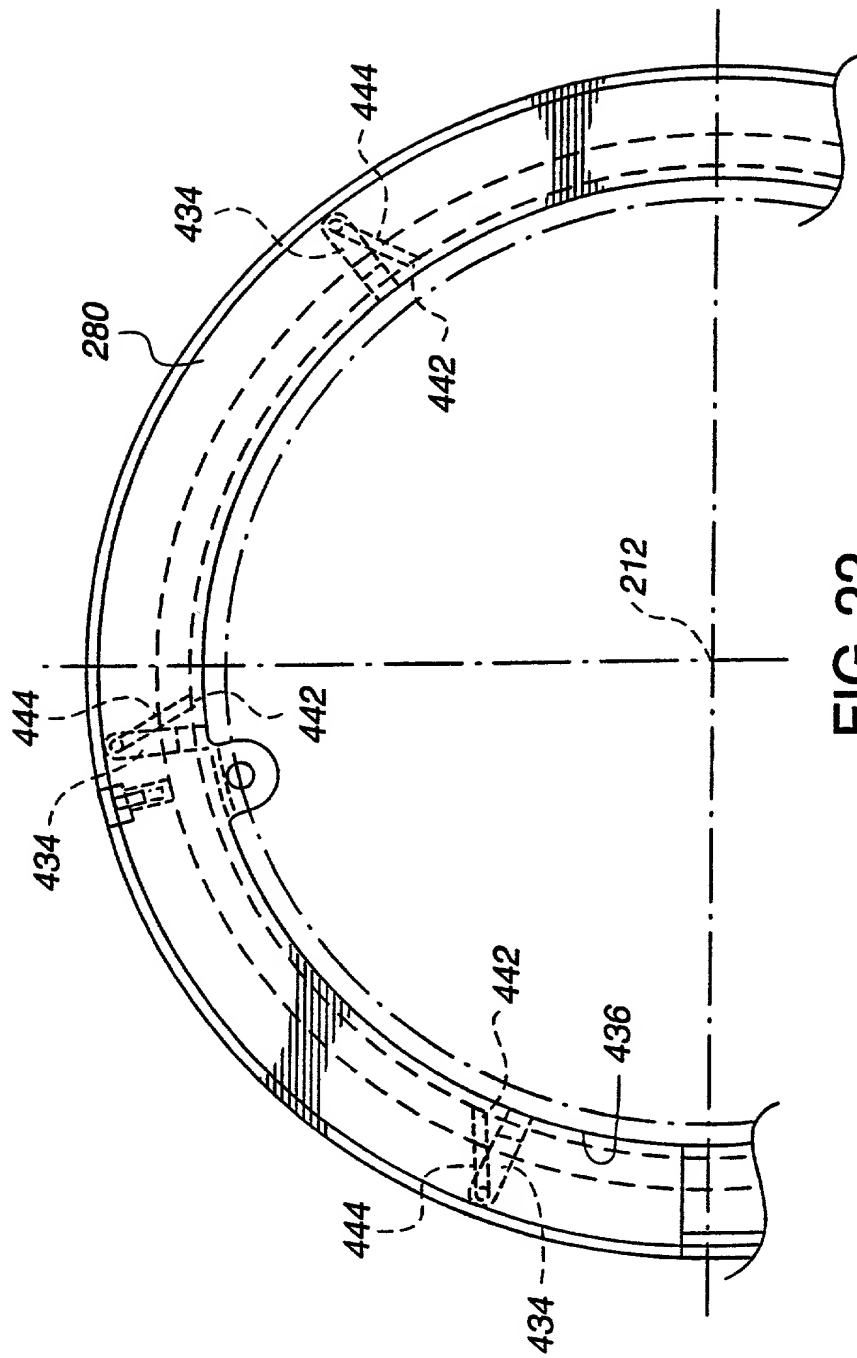


FIG. 22

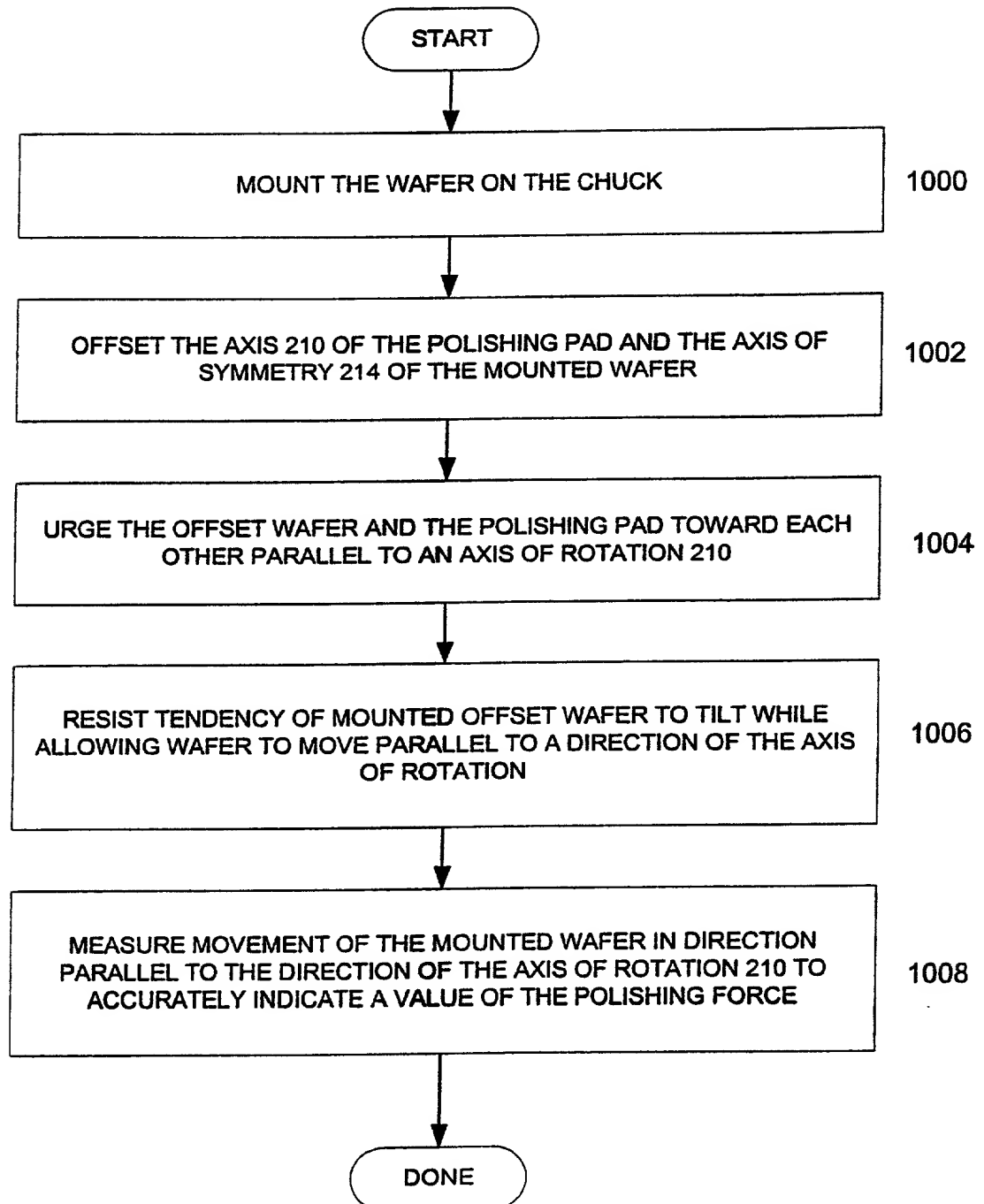


FIGURE 23

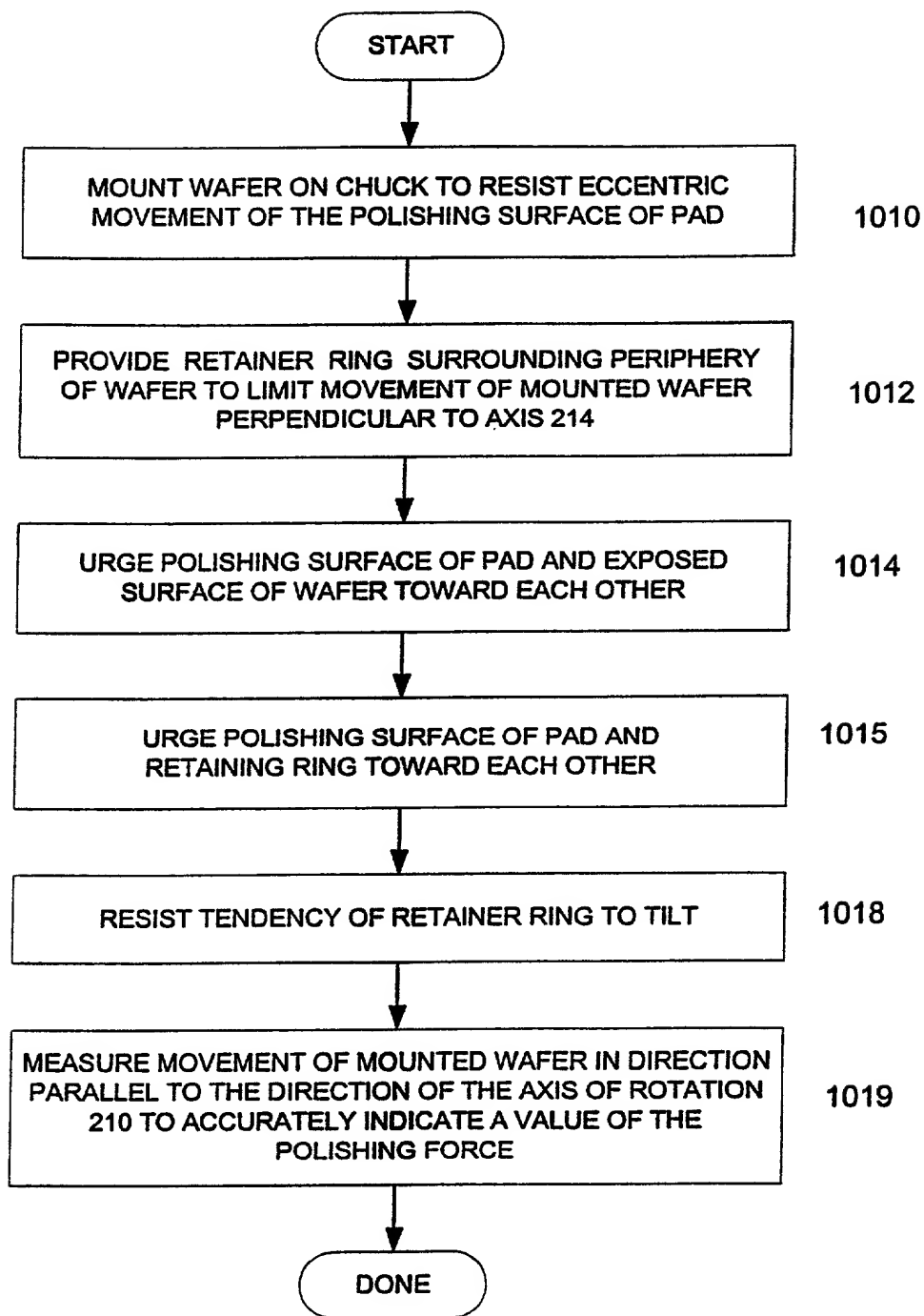


FIGURE 24

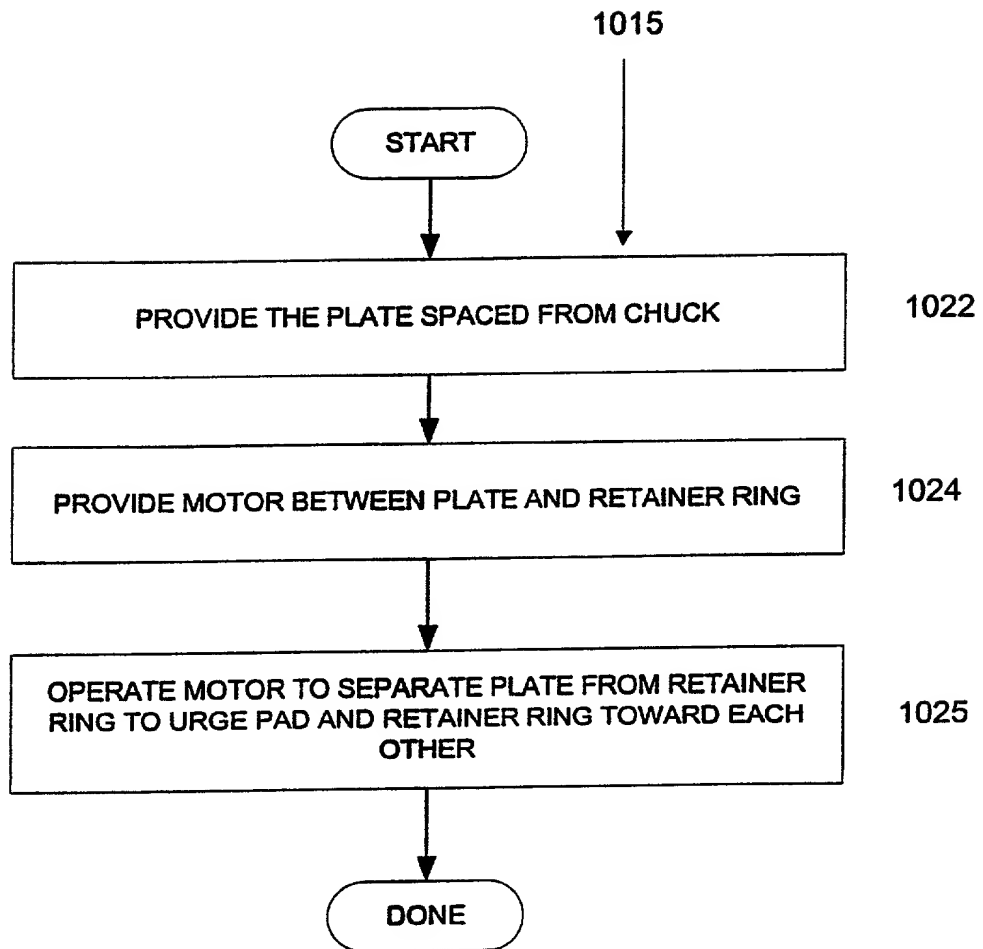


FIGURE 25

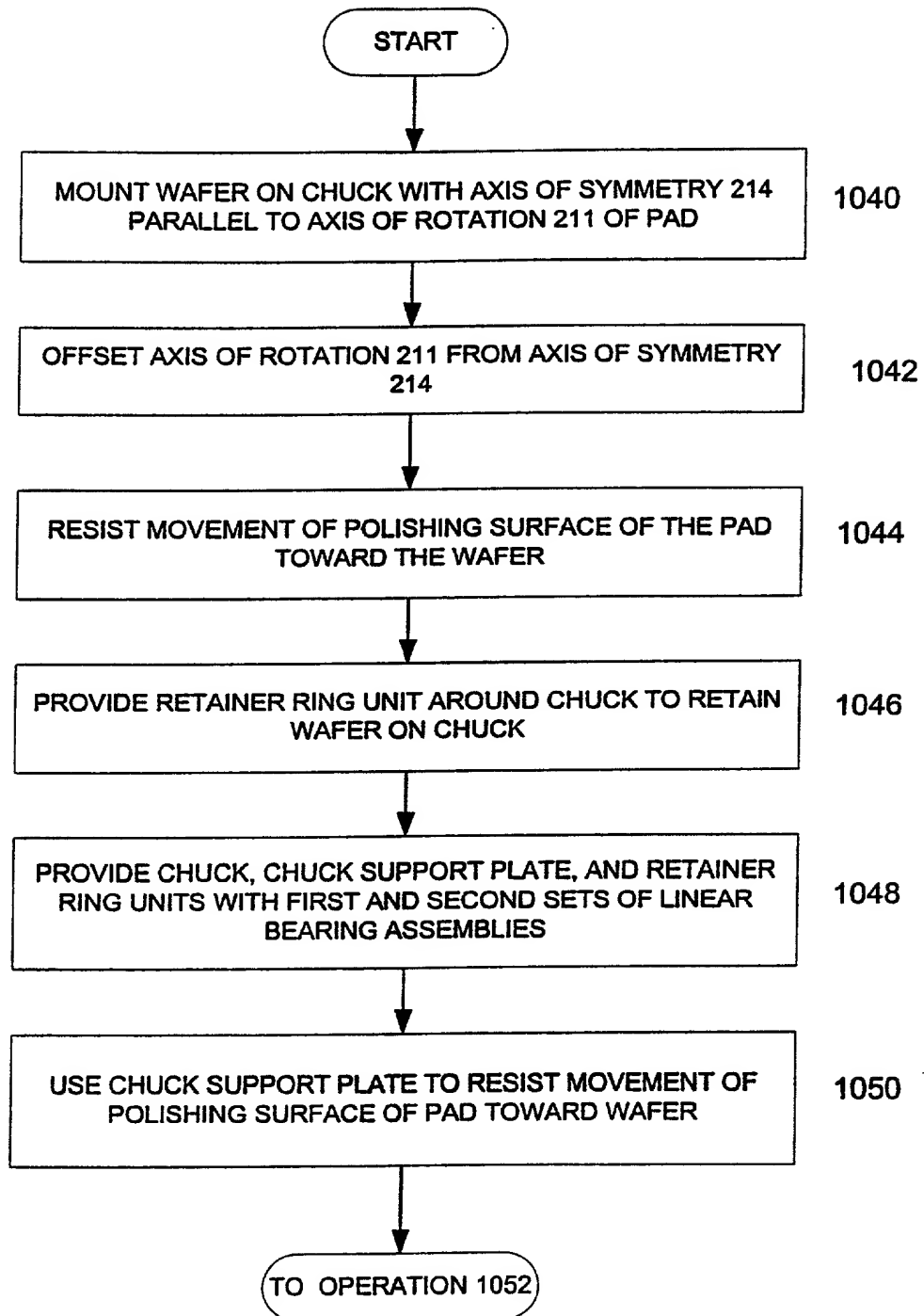


FIGURE 26

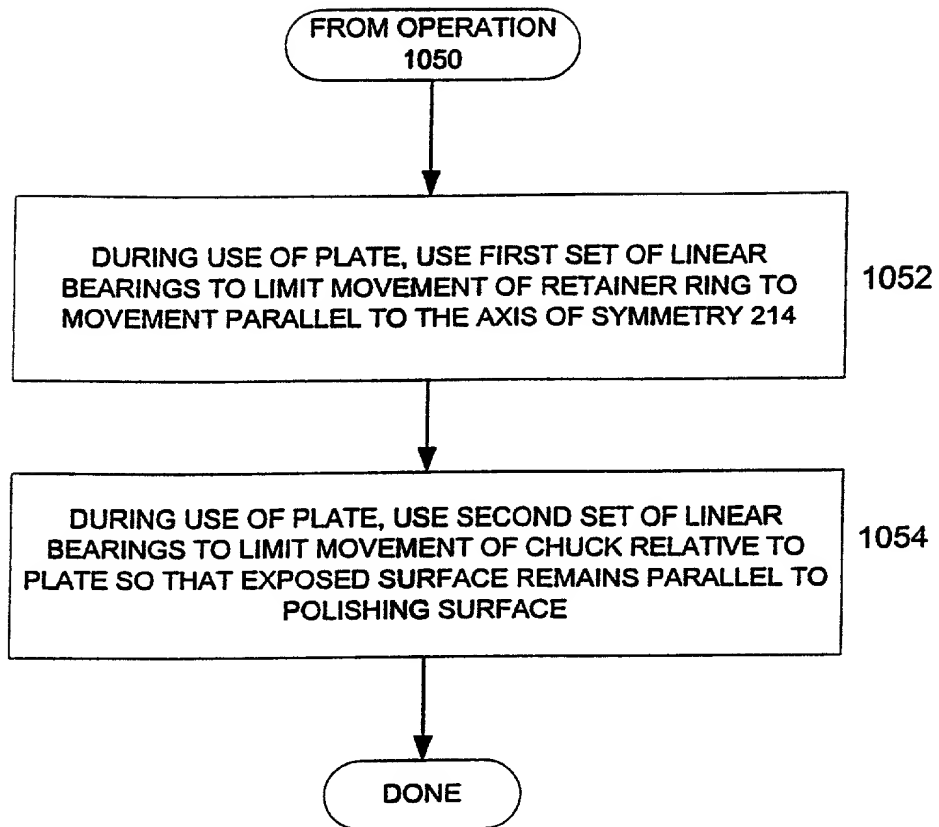


FIGURE 27

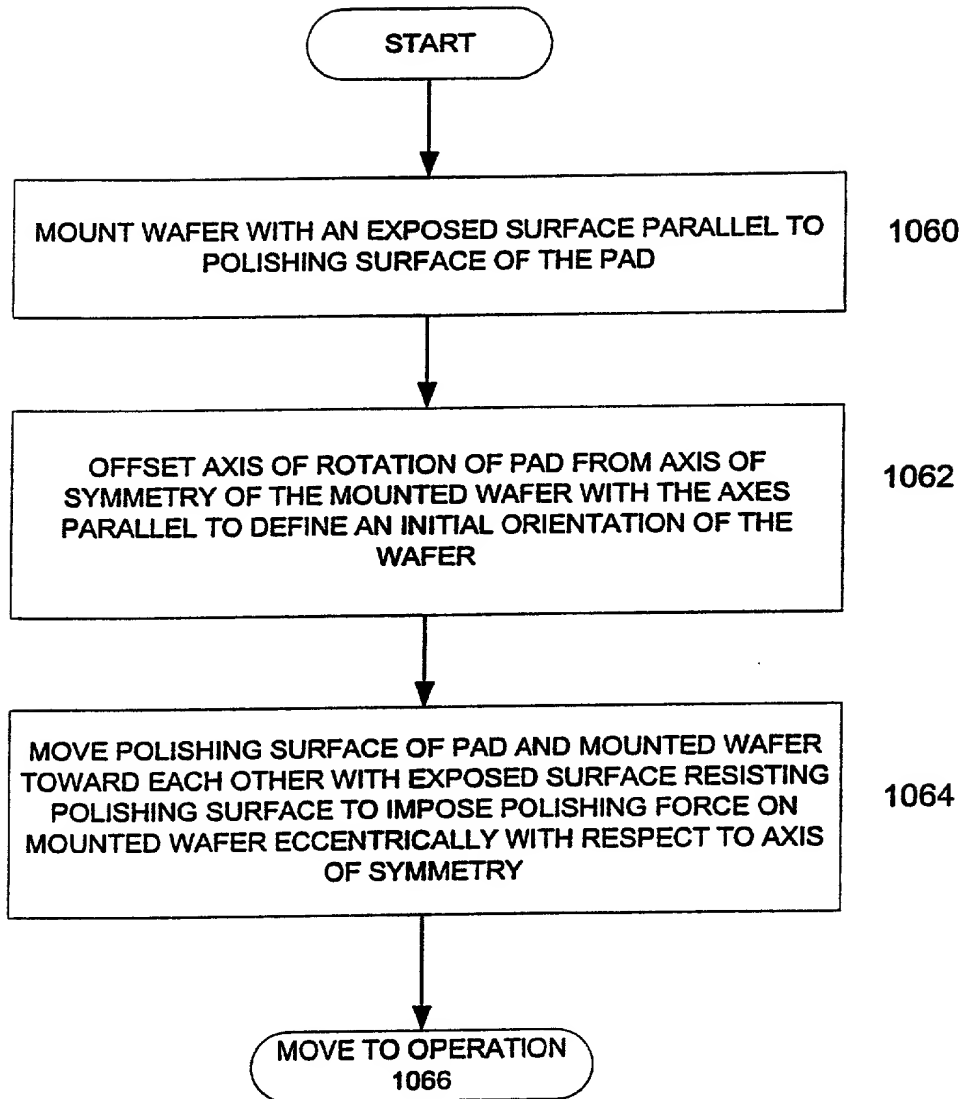


FIGURE 28

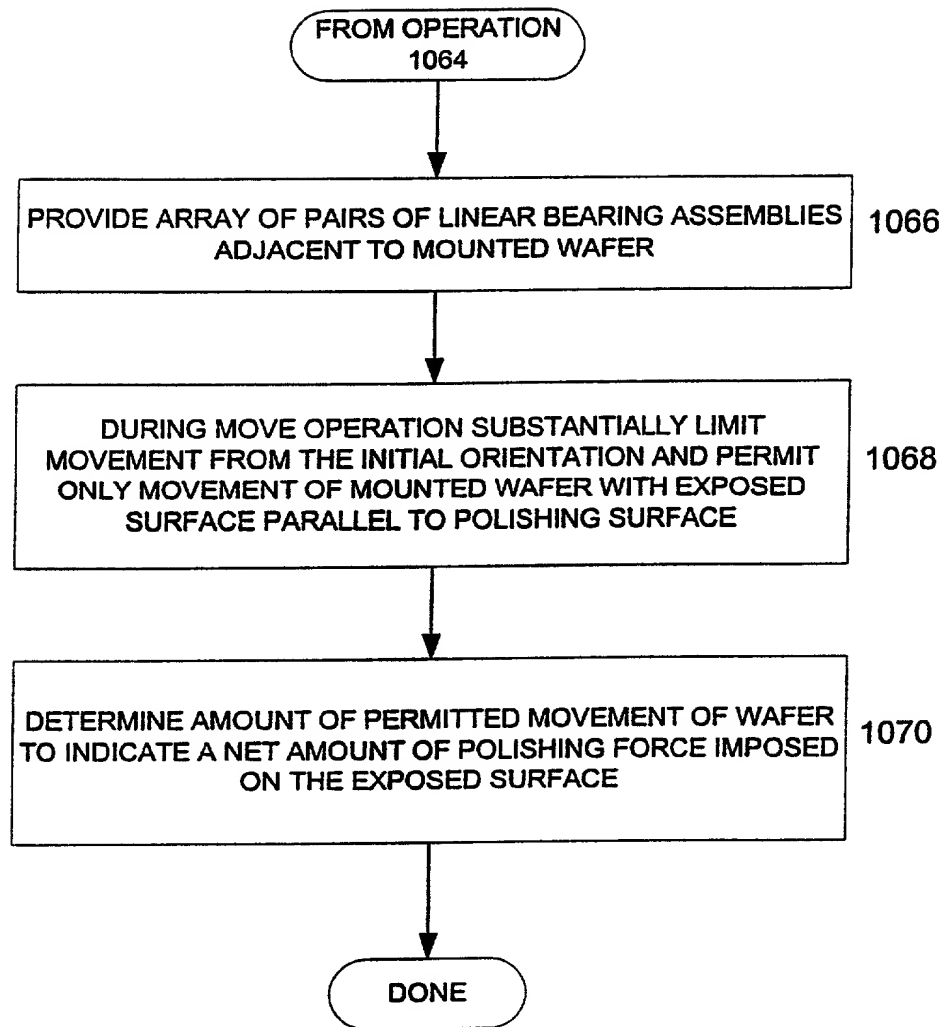


FIGURE 29

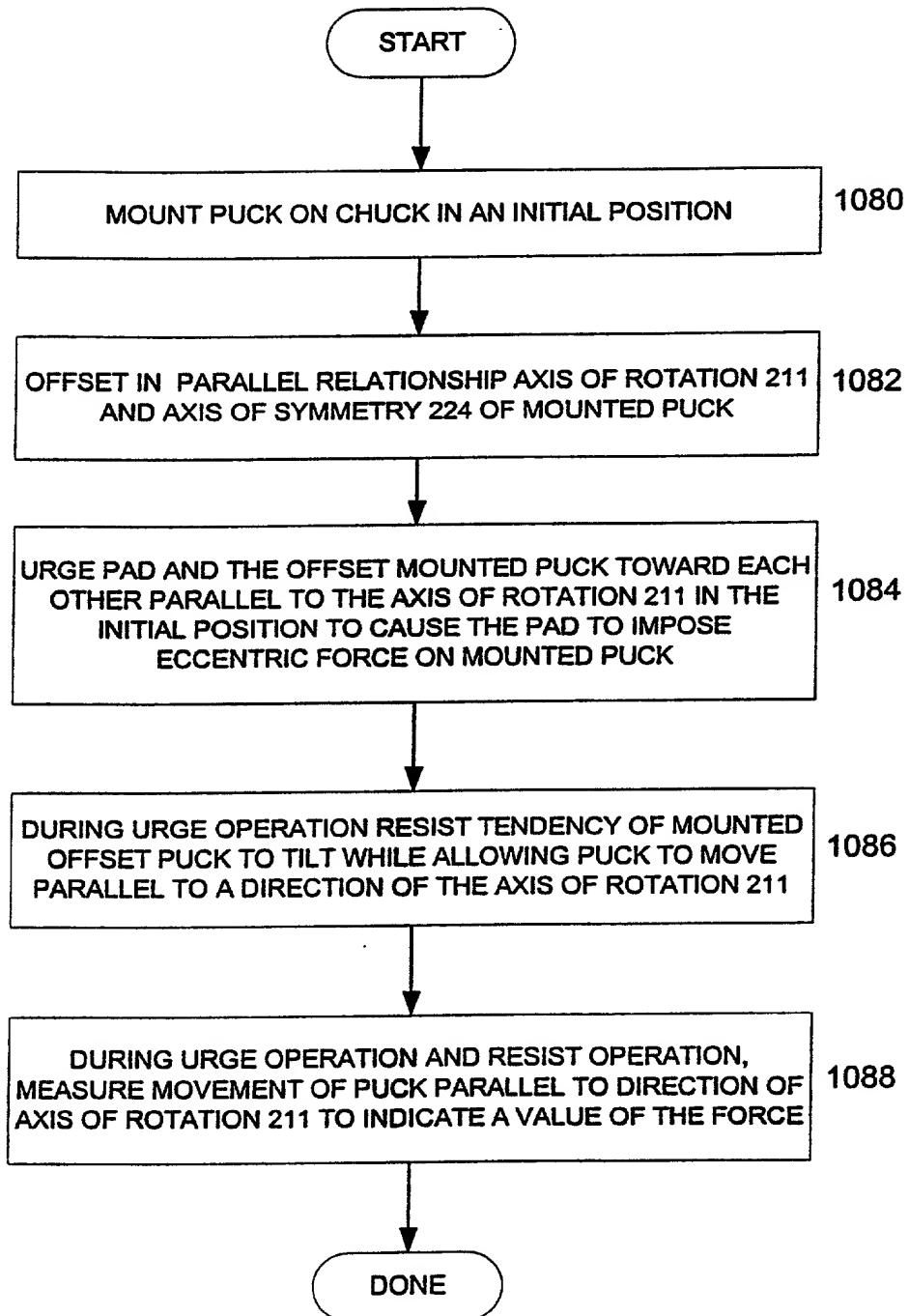


FIGURE 30

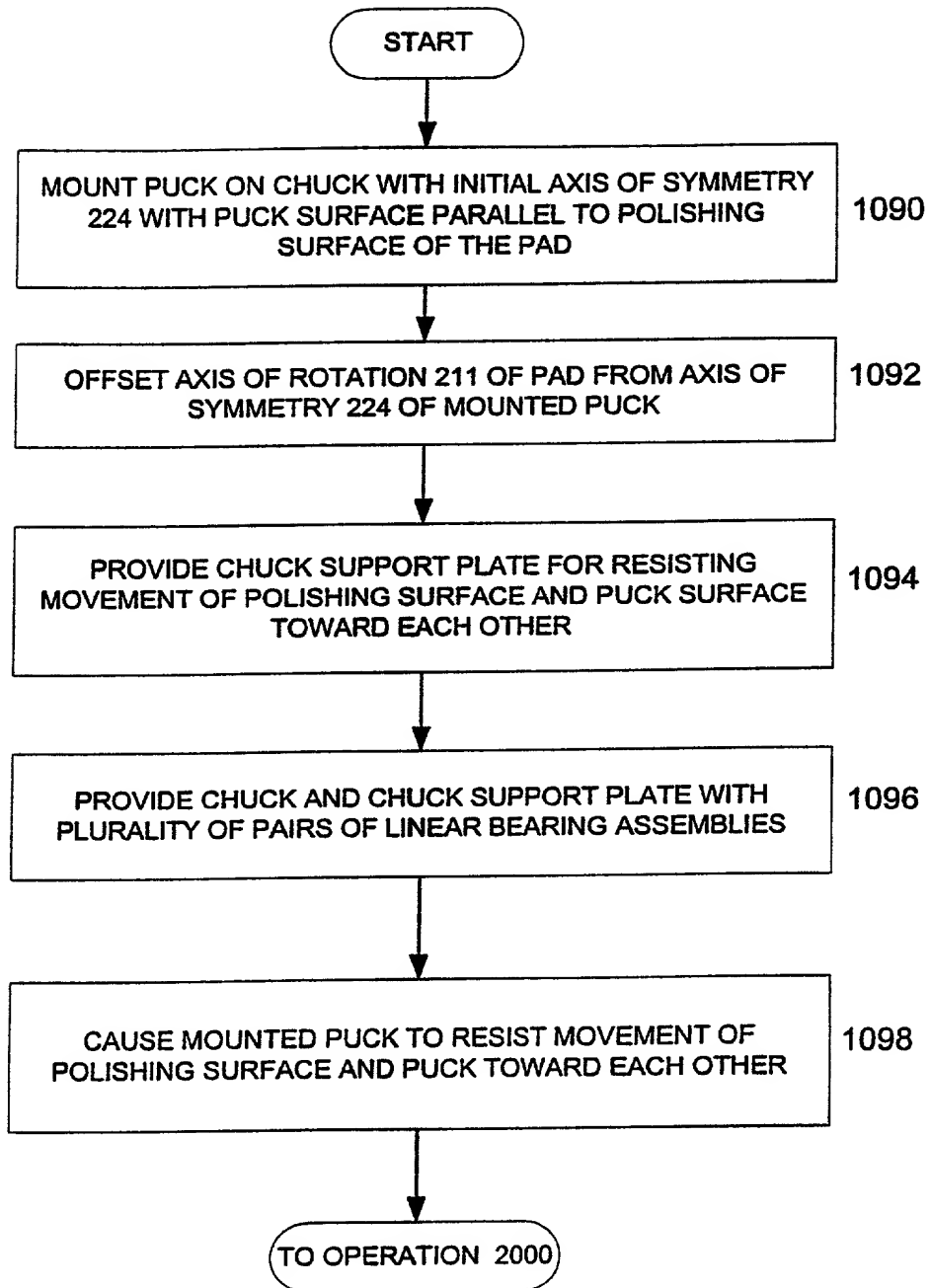


FIGURE 31

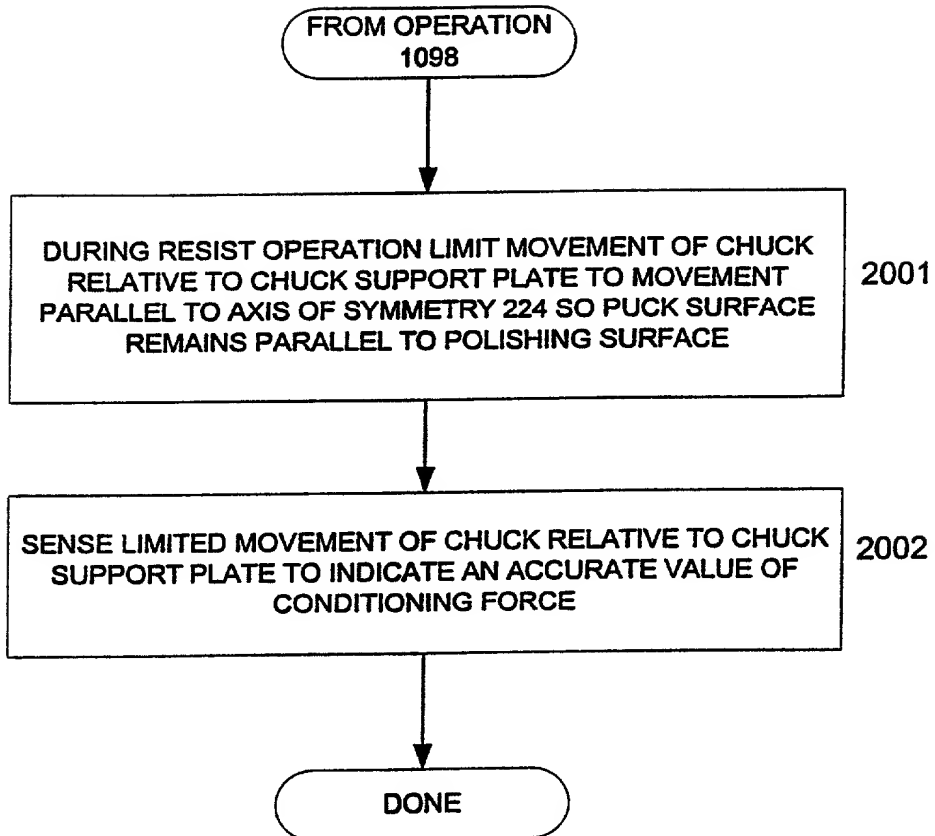


FIGURE 32

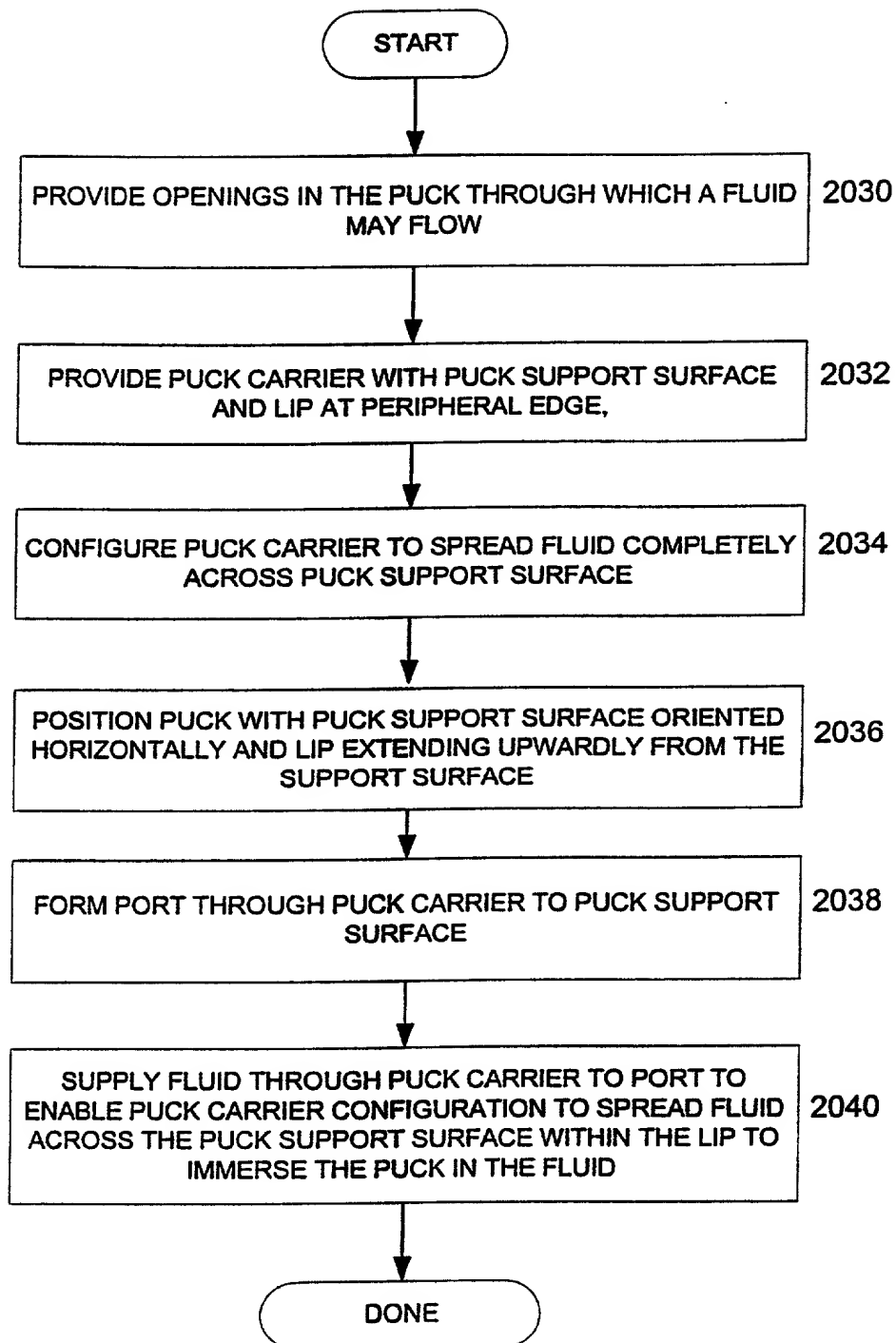


FIGURE 33

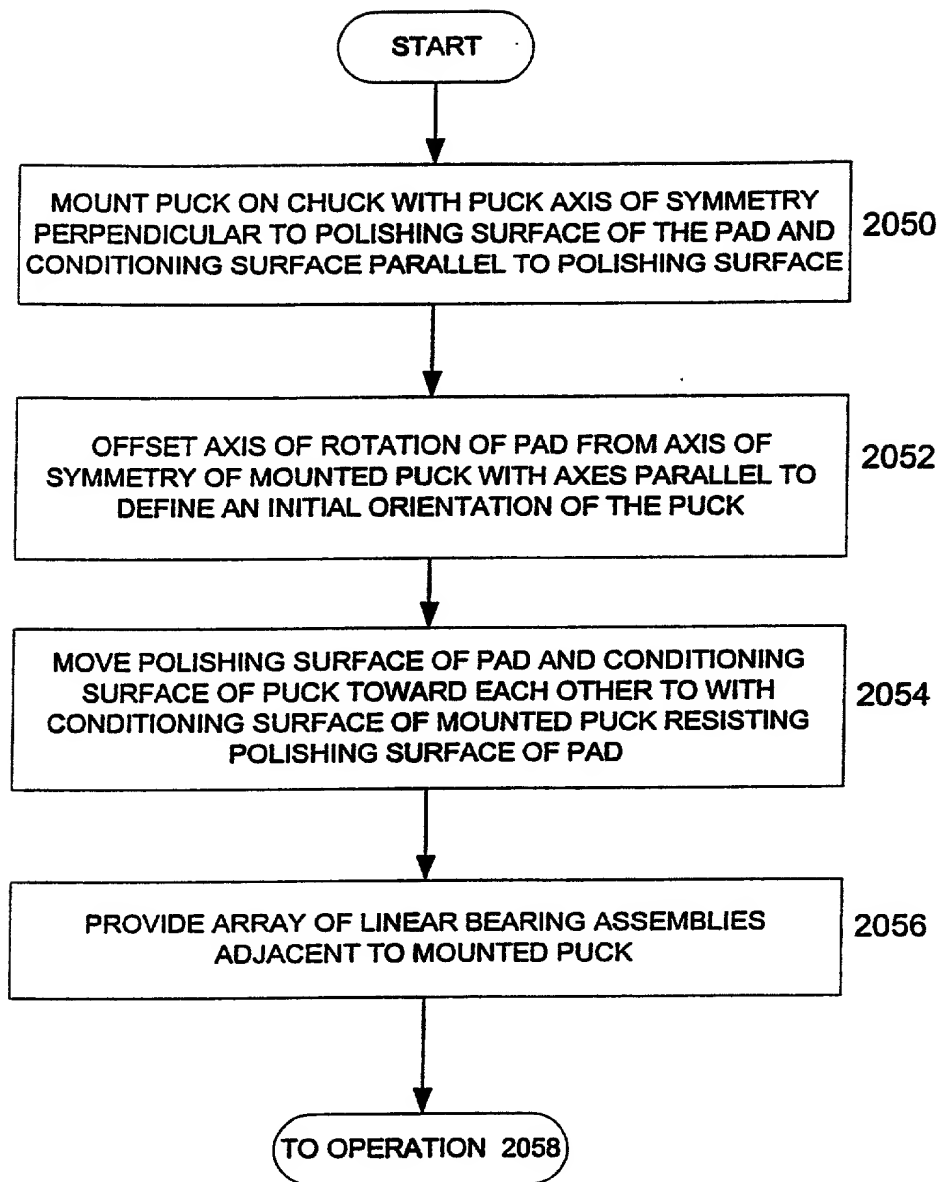


FIGURE 34

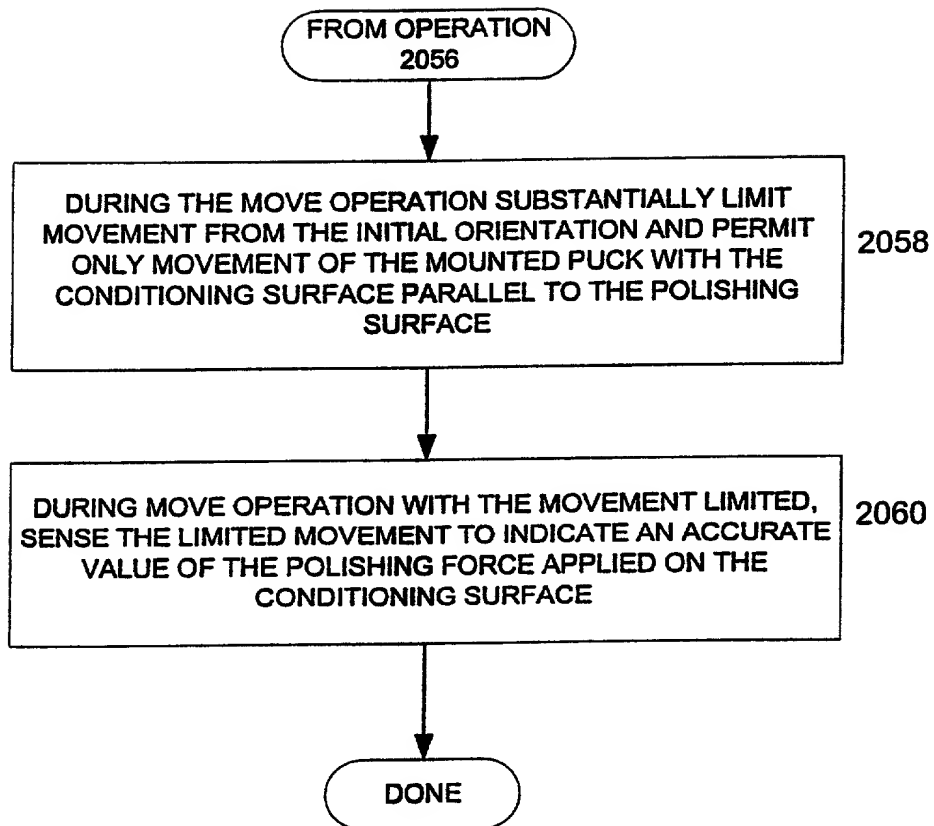


FIGURE 35

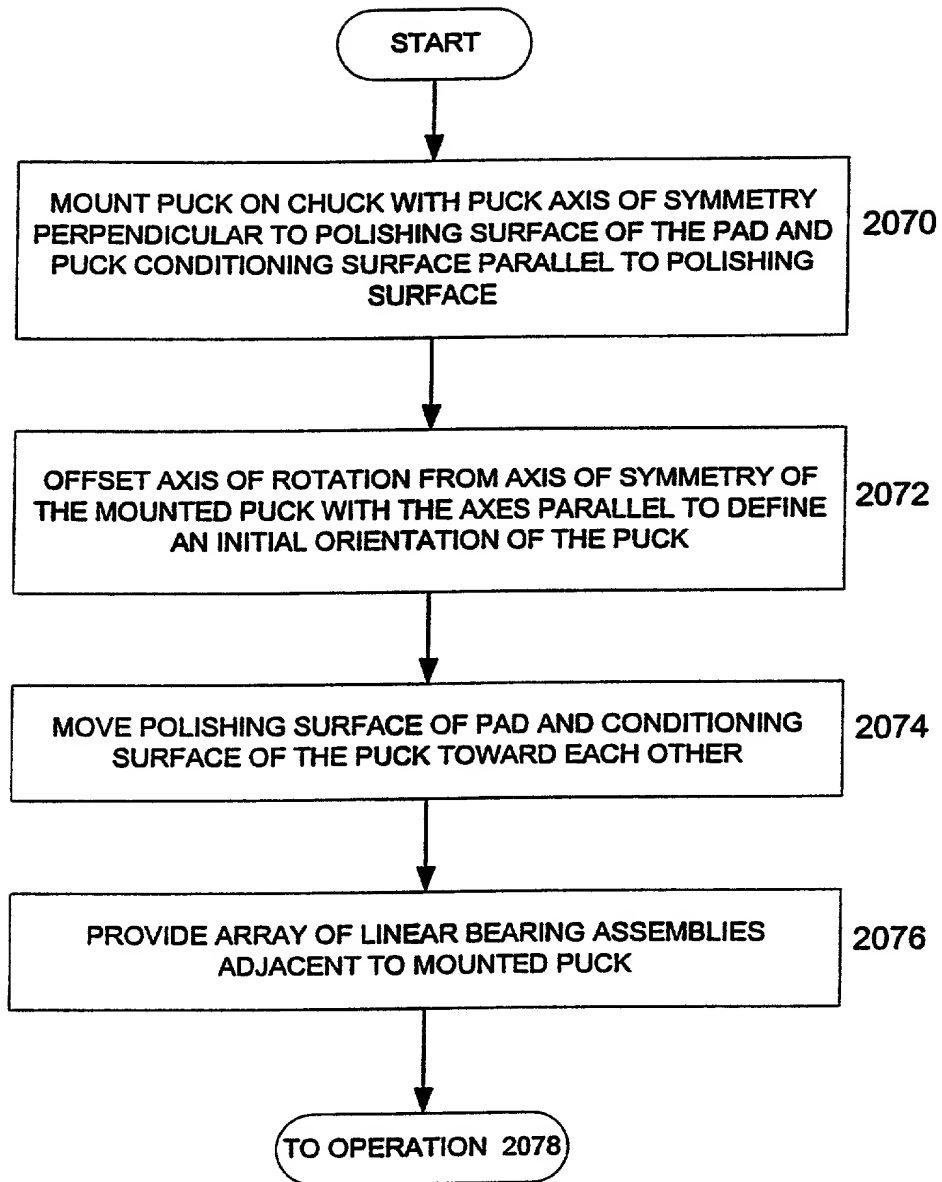


FIGURE 36

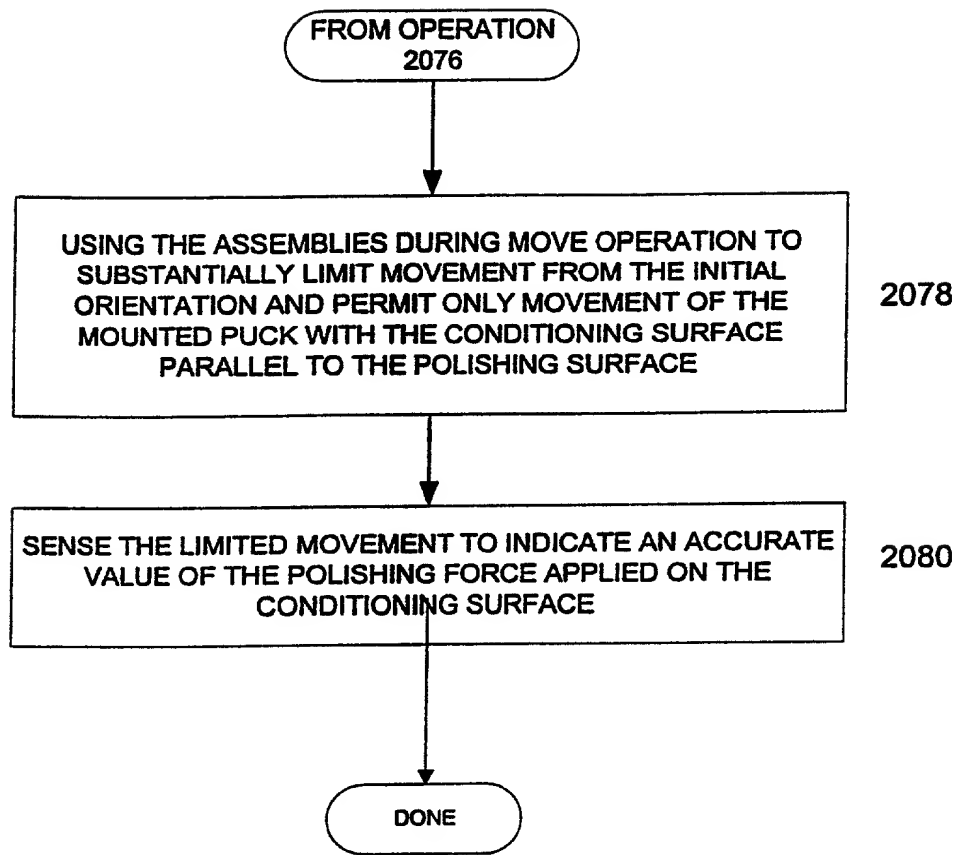


FIGURE 37

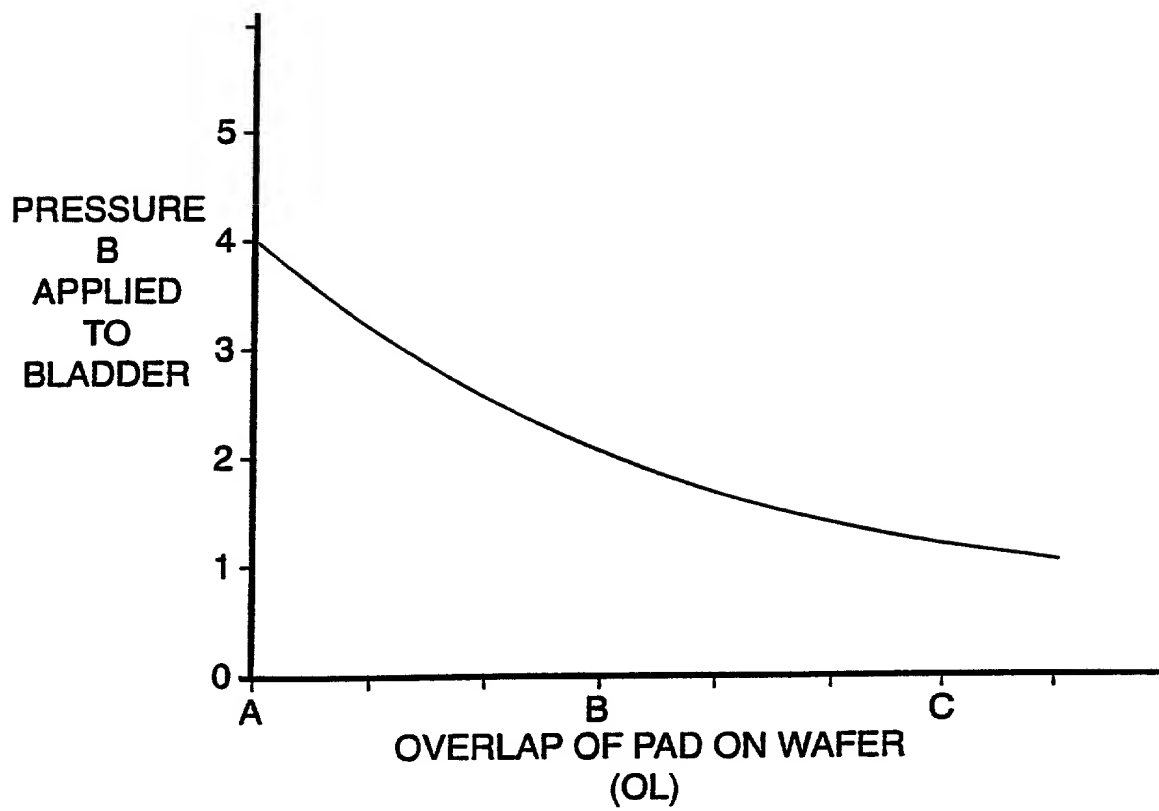


FIG. 38

FIG. 40 is a block diagram of a system for controlling a wafer carrier, a puck head, and a retainer ring. The system includes a PC 2102, a MACHINE CONTROL O/S 2106, a METROLOGY 2160, a HARD DRIVE 2146, an ANALOG I/O 2179, a PAD MOTION 2360, an ENCODER 2156, a FORCE CONTROLLER 2300, and a FORCE 290. The PC 2102 is connected to the MACHINE CONTROL O/S 2106 via a bus 2104. The MACHINE CONTROL O/S 2106 is connected to the METROLOGY 2160 via a bus 2106. The METROLOGY 2160 is connected to the PAD MOTION 2360 via a bus 2150. The PAD MOTION 2360 is connected to the ENCODER 2156 via a bus 2156. The ENCODER 2156 is connected to the FORCE CONTROLLER 2300 via a bus 2184. The FORCE CONTROLLER 2300 is connected to the HARD DRIVE 2146 via a bus 2146. The FORCE CONTROLLER 2300 is connected to the ANALOG I/O 2179 via a bus 2179. The FORCE CONTROLLER 2300 is connected to the FORCE 290 via a bus 2153W. The FORCE 290 is connected to the WAFER CARRIER 208, the PUCK HEAD 220, and the RETAINER RING 282 via a bus 2153W.

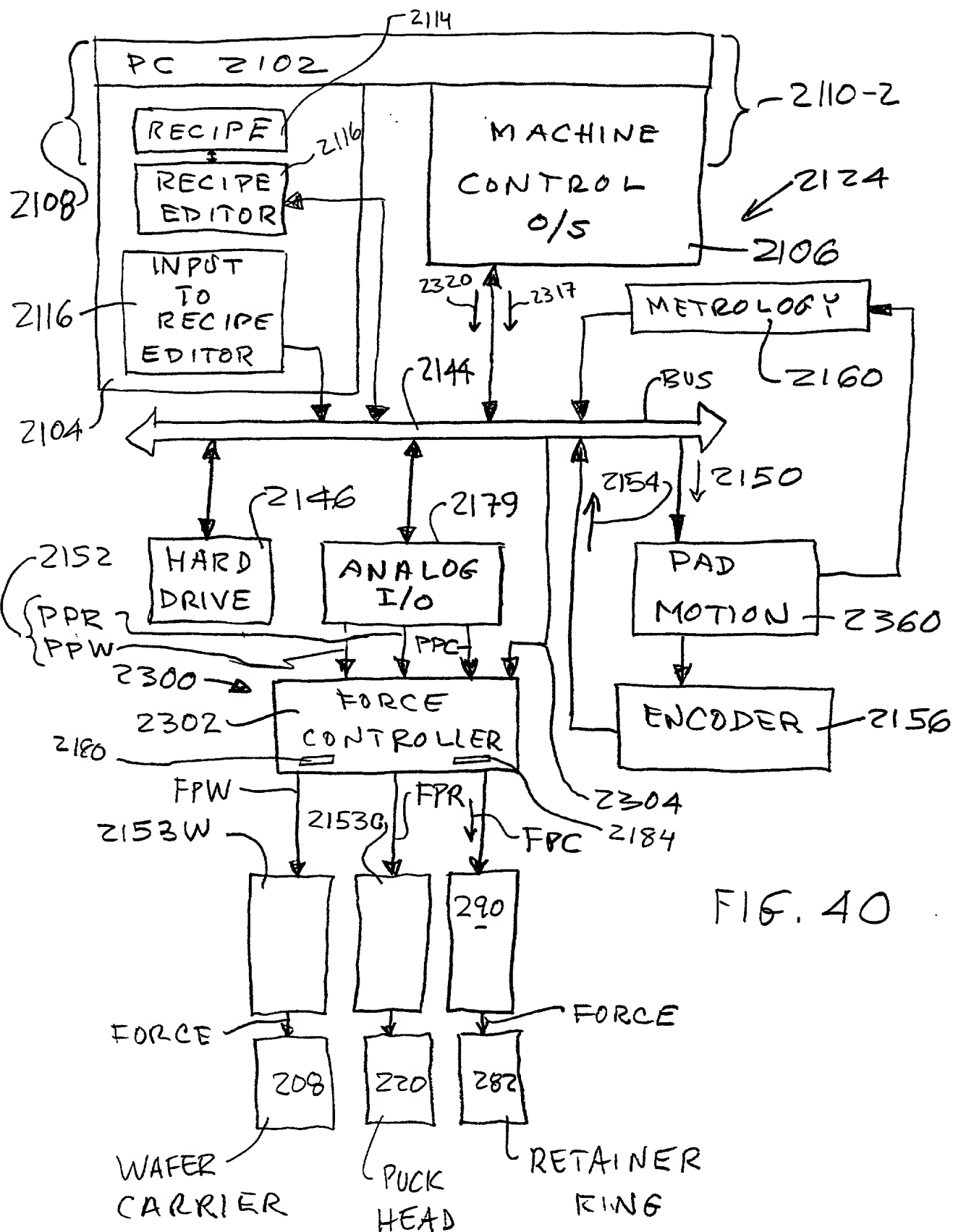


FIG. 40

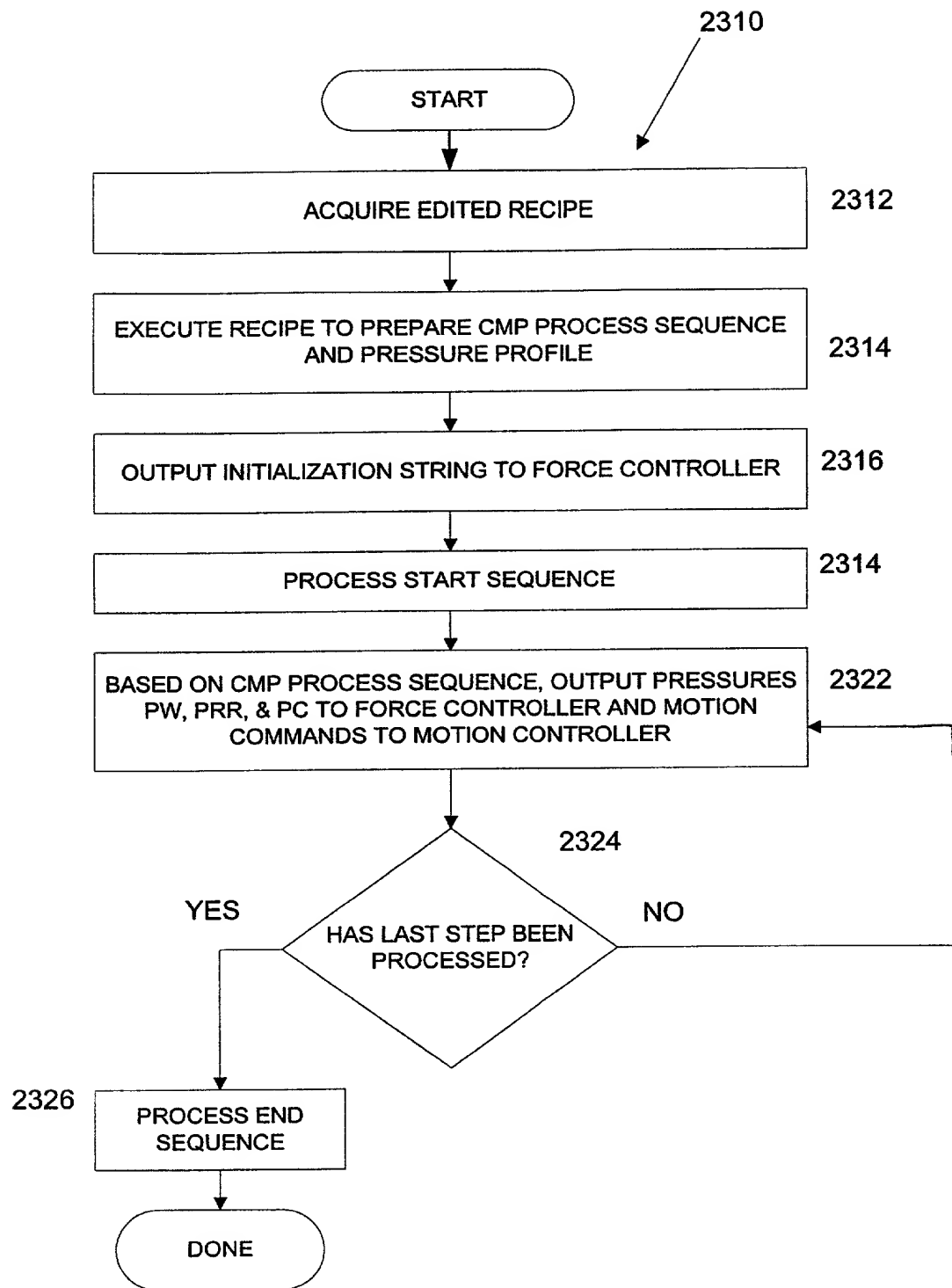


FIGURE 41

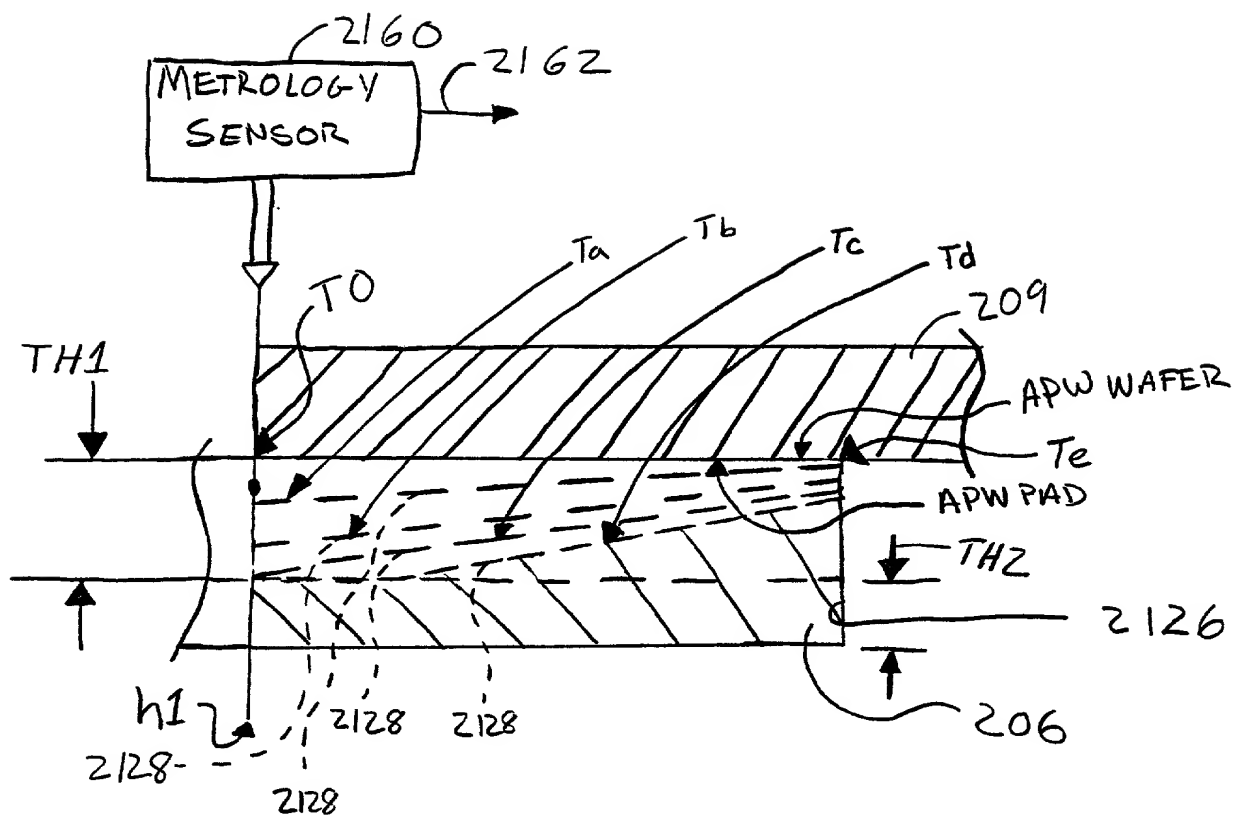


FIG. 42A

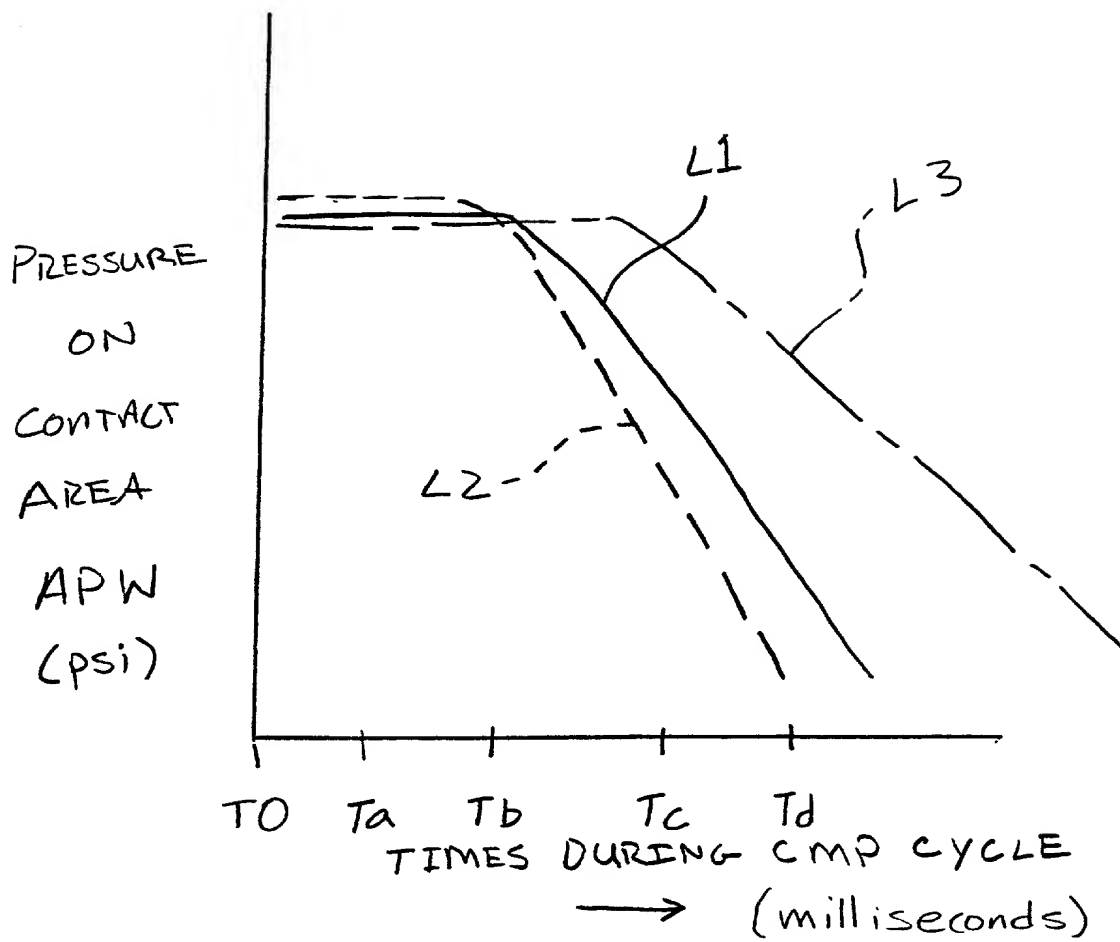


FIG. 42 B

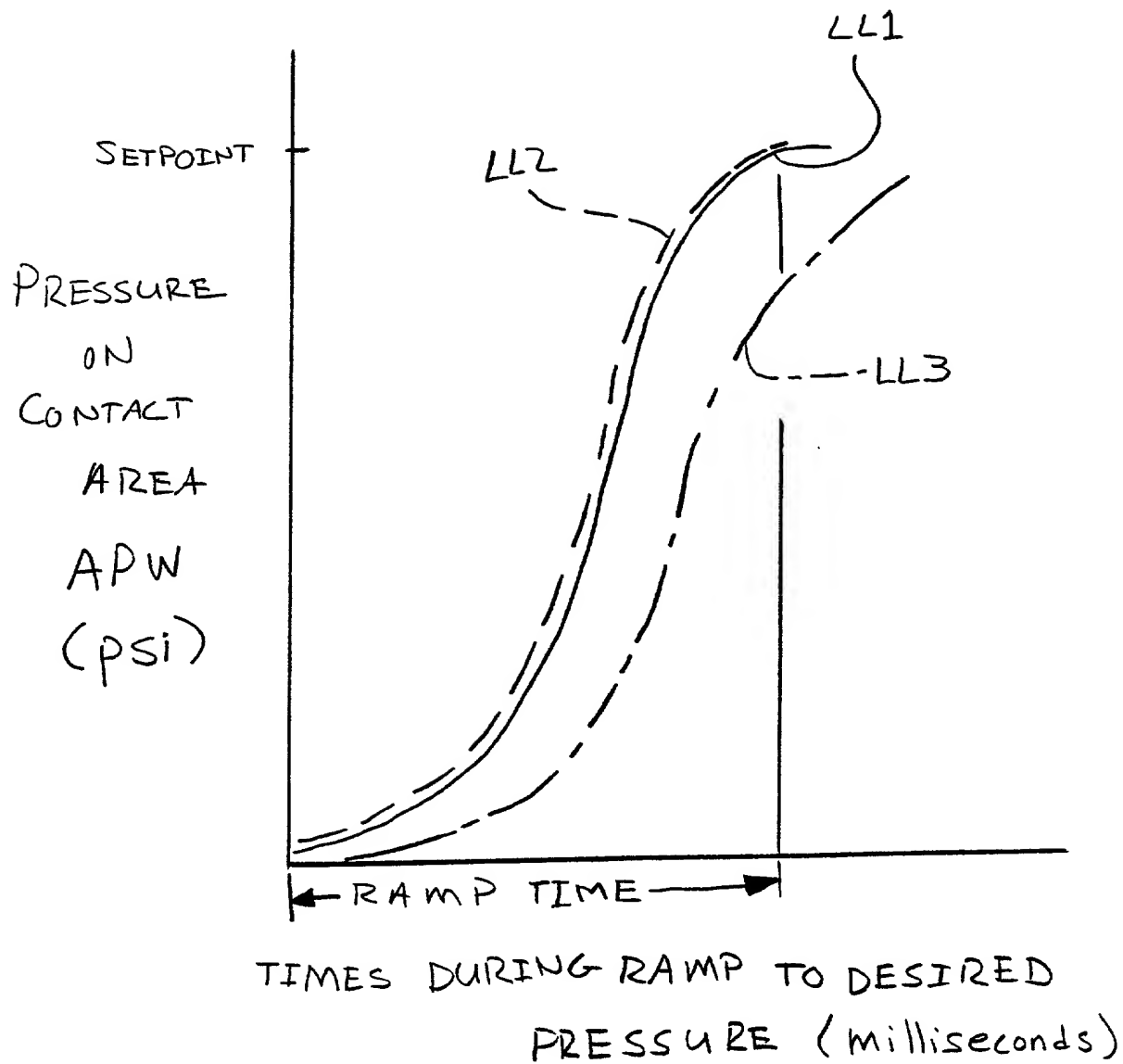


FIG. 42C

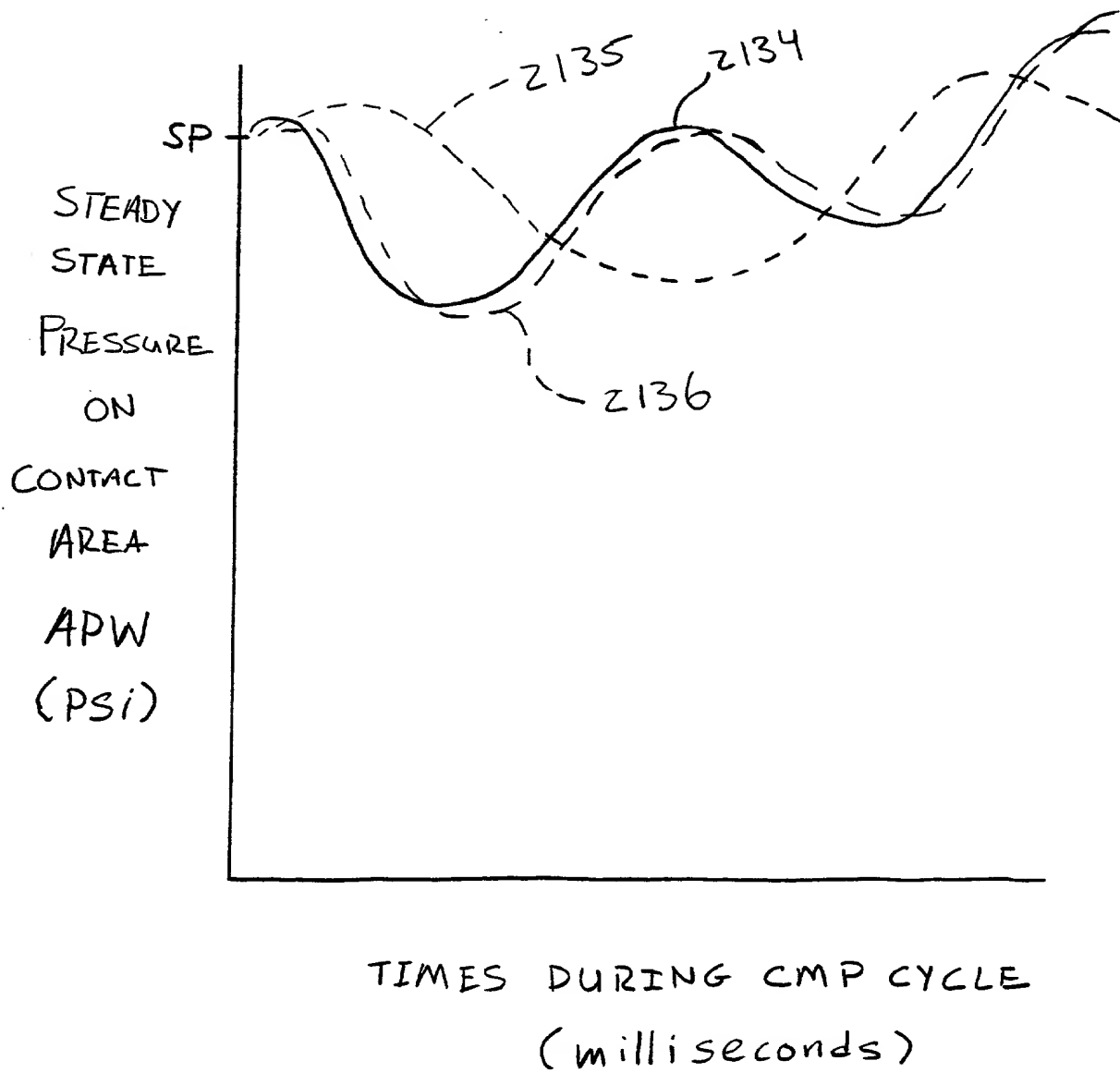
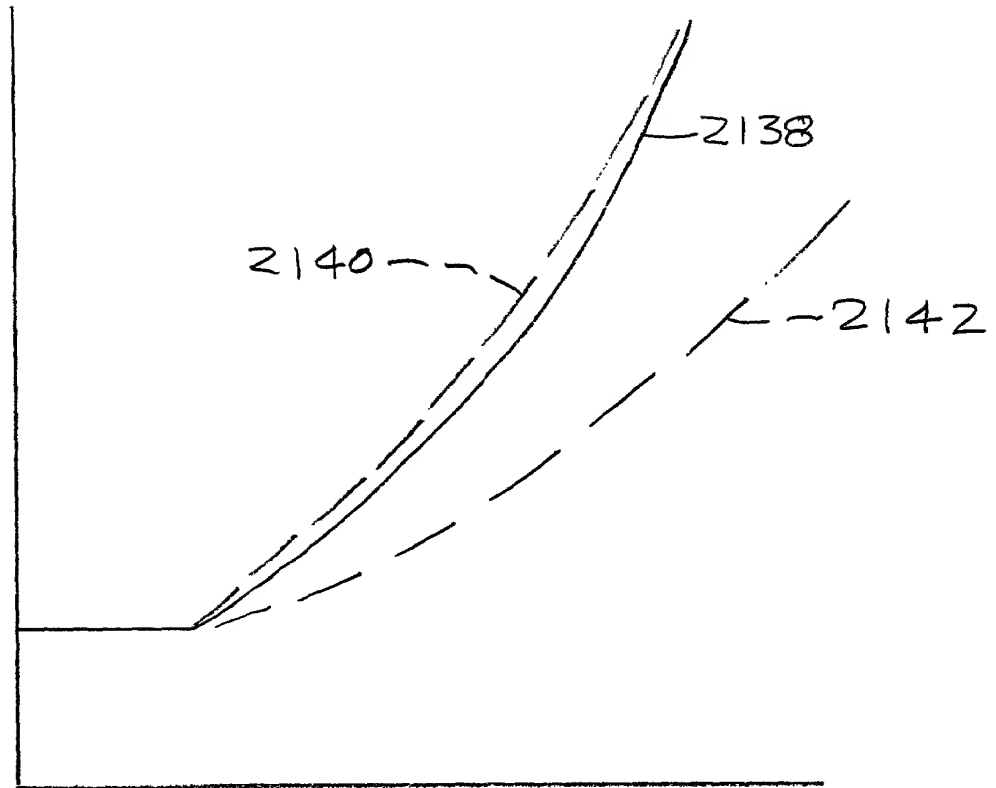


FIG. 42D

RELATIVE
POSITION
OF
WAFER
AND
PAD
(value
of
 h_3)



TIMES DURING STEP OF
CMP CYCLE
(milliseconds)

FIG. 42E

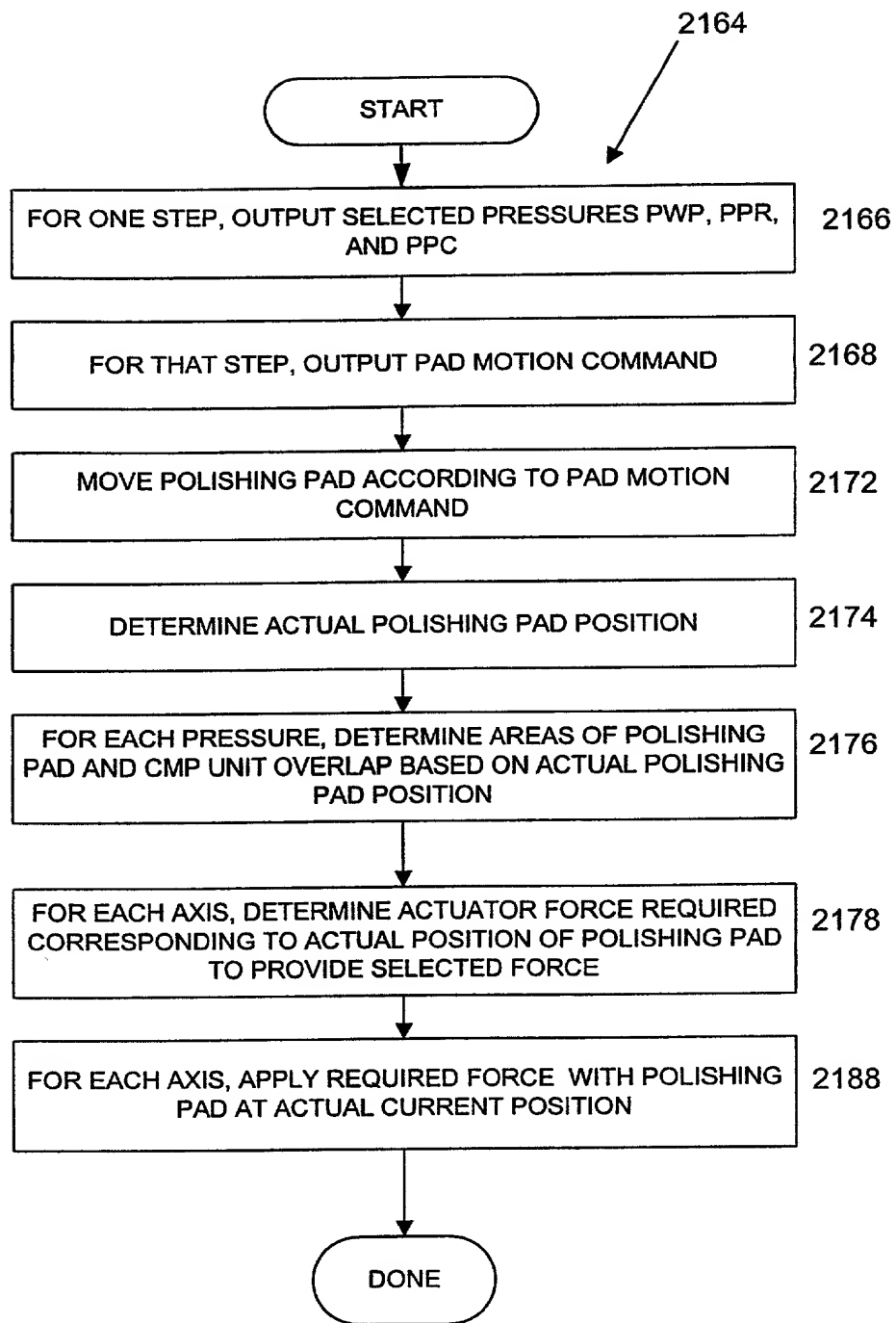


FIGURE 43

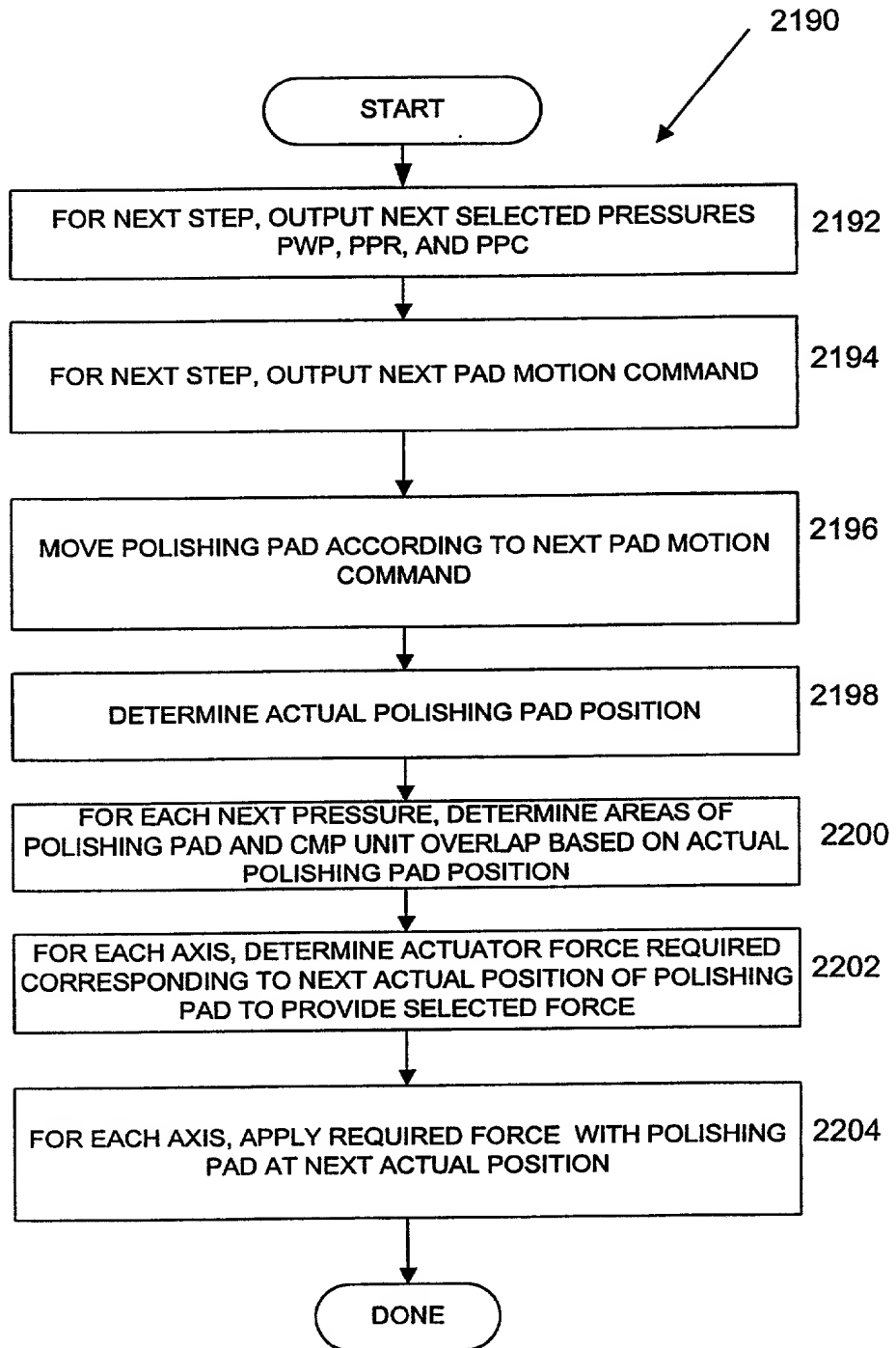


FIGURE 44

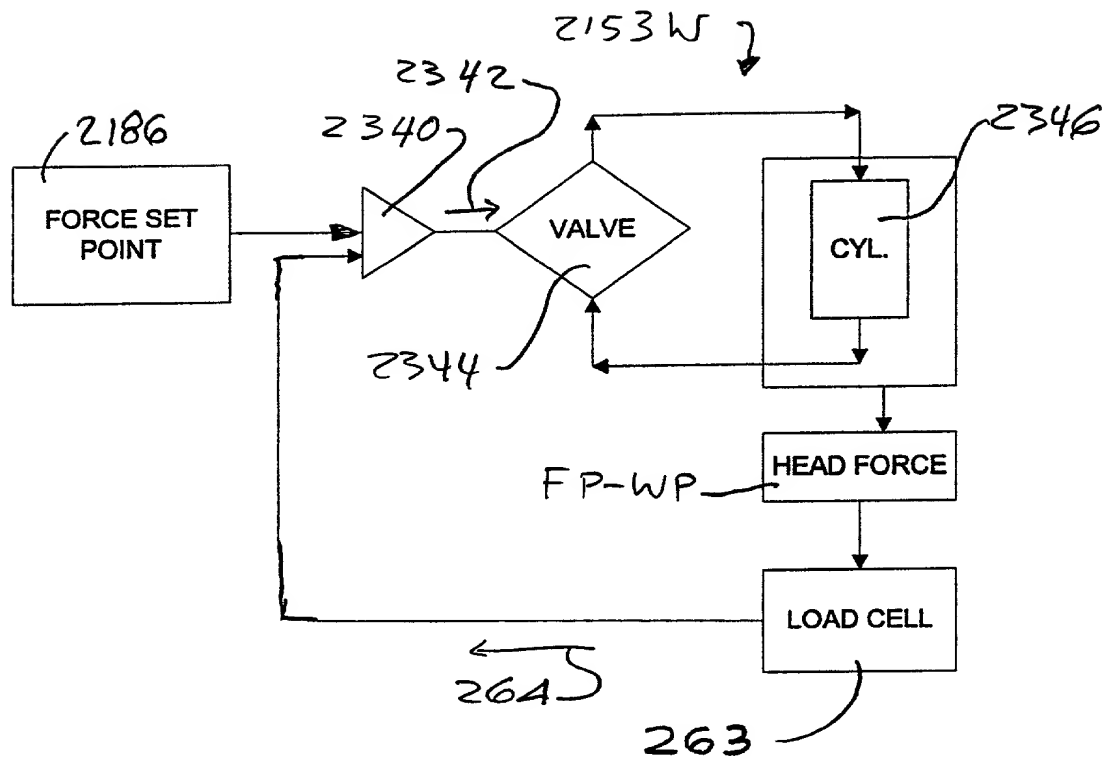


FIG. 45

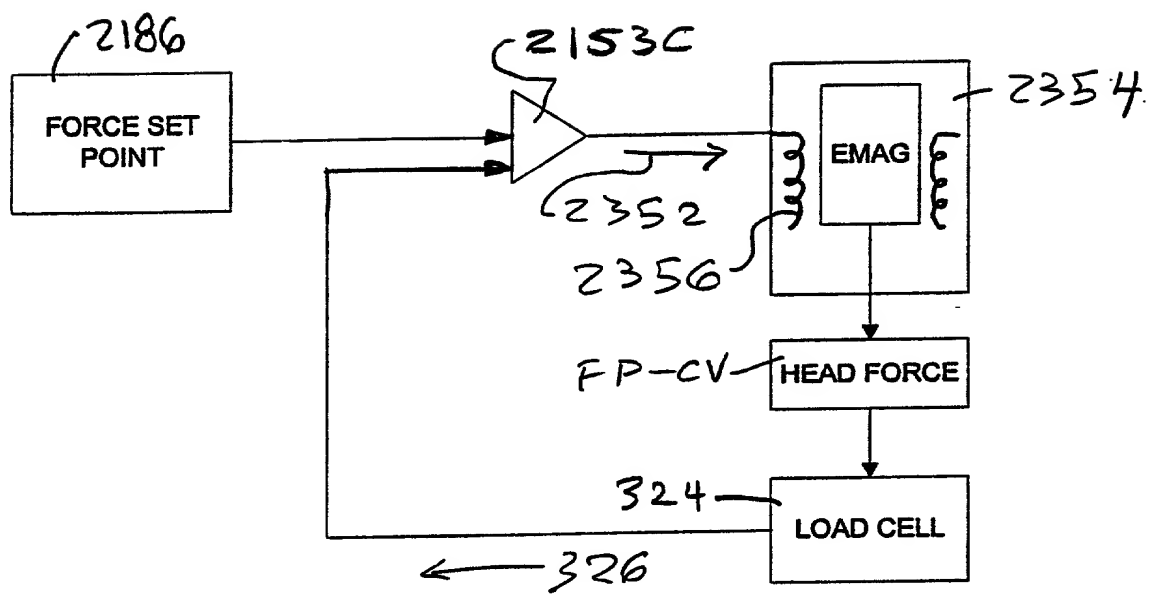


FIG. 46

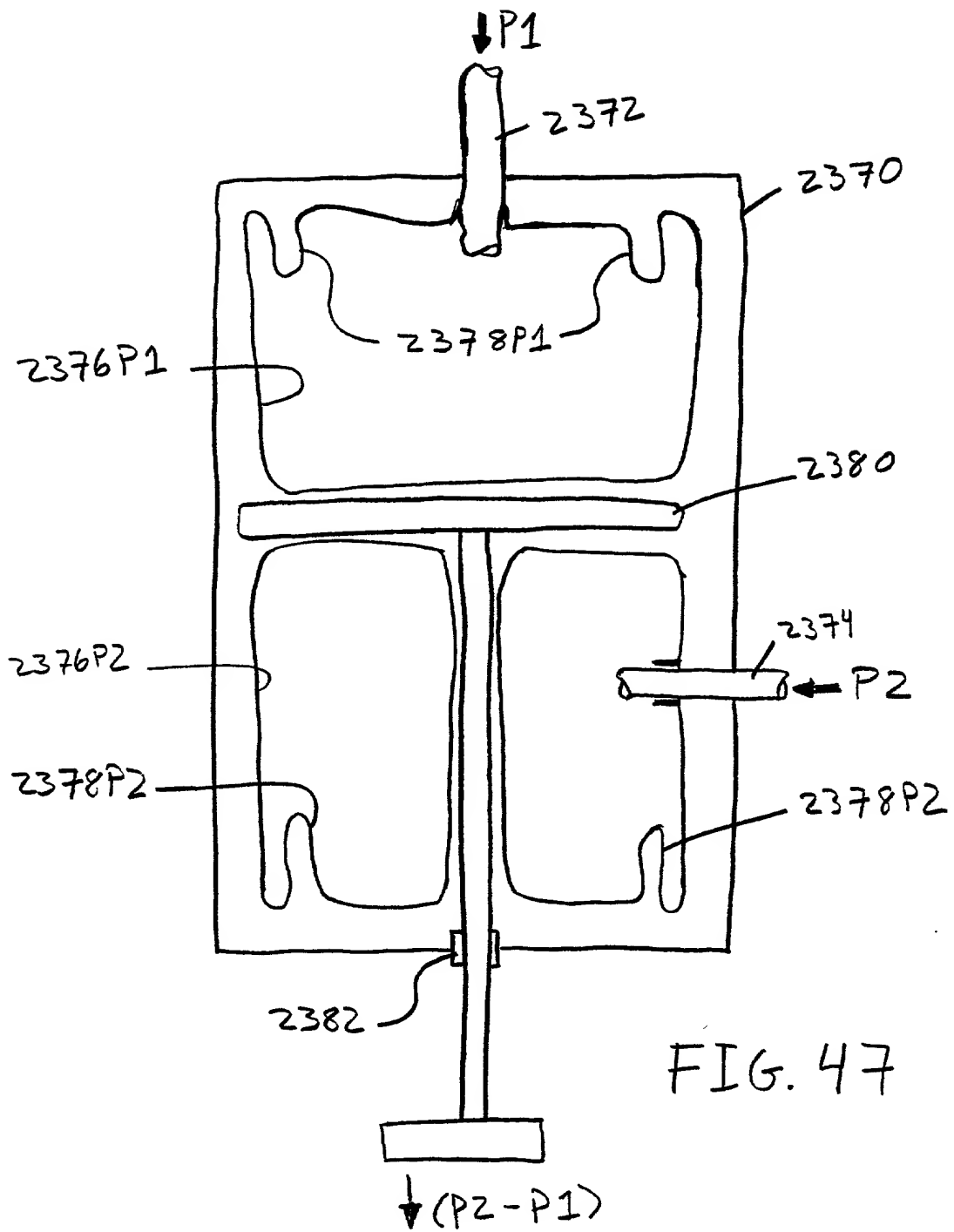


FIG. 47

